

Klaus Dreyer



AMAZONE

Successful machinery over 130 years of company history



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Contact**Publisher:**

AMAZONEN-WERKE H. Dreyer GmbH & Co. KG
D-49205 Hasbergen-Gaste

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Layout and print setting:

Köster & Gloger GmbH, Osnabrück

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2012

Am Amazonenwerk 9 – 13, D-49205 Hasbergen
www.amazone.de

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Foreword

For many generations the Dreyer family, owners of AMAZONEN-WERKE, have been involved with the production of agricultural implements. Even by the end of the 18th century the cartwright and carpentry business of the Dreyers' had produced a winnower in and around the city of Osnabrück.

In 1883 Heinrich Dreyer took over the workshop from his father Caspar Heinrich Dreyer and registered his company for the factory production of agricultural machinery.

The name was: Landmaschinenfabrik Heinrich Dreyer, Gaste. His first and own-developed modern grain cleaning machine (also called a winnower) was immediately awarded a medal at a renowned exhibition in Bremen. He called the machine "AMAZONE" and for many years it continued to be a big success.

However, Heinrich Dreyer, did not want to solely rely on this product and so he developed in 1910 another successful product, the potato sorter "Federkraft" and five years later a box fertiliser distributor which he called "Michel". In the course of the years that followed all the inventions from Heinrich Dreyer resulted in them being a commercial success and were sold in hundreds of thousands.

In the mid-thirties, the second generation took over the responsibility for the business which in the meantime had grown to approximately 500 employees. These were Dipl. Eng. Heinrich Dreyer and his younger brother Erich Dreyer. Erich was responsible for sales whilst Heinrich took over the technical development of the company. His favourite field was potatoes and so, in 1942, he introduced the first potato harvester to the market. However, also the AMAZONE seed drill and the AMAZONE manure spreader were developed under his direction. Unfortunately the second generation was granted only a short time to direct the company as Erich Dreyer died as a soldier in the war and Heinrich died at an early age in 1957.

So the third generation had to take over the responsibility for AMAZONEN-WERKE quite early. These were Prof. h.c. (SAA Samara) Dr. Dr. h.c. Heinz Dreyer and his cousin Klaus Dreyer. They continued the tradition of the company and developed some breakthrough agricultural implements. So, Prof. Heinz Dreyer invented, in his first year, the successful AMAZONE ZA twin disc fertiliser spreader and a few years later the equally famous modern AMAZONE D4 tractor seed drill. Thanks to the success of these two models AMAZONE quickly achieved market leadership in Germany.

However, also in other fields AMAZONEN-WERKE managed to develop some very successful products, such as seed drill combinations, crop protection sprayers and soil tillage implements. In 1999, the fourth generation took over at the helm of the, by now, large AMAZONE ship. These are Dipl. Econ. Eng. Christian Dreyer and his cousin, Dipl. Eng. Dr. Justus Dreyer. They are on the right path to continue the success of their predecessors. AMAZONE is developing into one of the most important family-owned businesses of agricultural technology in Europe and, with its many awards; it is the most innovative family-owned business of the entire sector. With its strong development team it will also, in the future, set an example for agricultural technology and will go on providing agriculture with economical and innovative systems.



Klaus Dreyer

Hasbergen, October 2012



Successful machinery from AMAZONEN-WERKE over 130 years of company history

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130
1883–2013

Innovation from tradition

| Introduction of new product ranges | Grain cleaning machines (until 1960) | | Potato sorter (until 1989) | | Potato harvesters (until 1967) | | Manure spreaders (until 1970) |
|--|---|---|-------------------------------|---|-----------------------------------|--|----------------------------------|
| | 1883 | 1902 | 1910 | 1920 | 1942 | 1948 | 1950 |
| | | Passive soil tillage | | Fertiliser spreaders | | Seed drills | |
| | | <ul style="list-style-type: none"> Siegfried sprung tine cultivator Pegasus winged tine cultivator | | <ul style="list-style-type: none"> Michel box and worm auger fertiliser spreader ZA twin-disc fertiliser spreader ZA-F twin-disc fertiliser spreader ZA-U twin disc fertiliser spreader ZG twin disc large area fertiliser spreader Jet pneumatic spreaders | | <ul style="list-style-type: none"> D1 – D8 conventional seed drill NT large area direct seed drills Airstar Progress pneumatic seed drills Airstar Profi pneumatic seed drills | |
| Current models 2013 | | <ul style="list-style-type: none"> Centaur combination tine & disc cultivator Catros compact disc harrow Cenius mulch cultivator | | <ul style="list-style-type: none"> ZA-X Perfect twin disc fertiliser spreader ZA-M twin disc fertiliser spreader ZA-M Profis weigh-cell system spreader ZA-M Ultra weigh-cell system spreader ZG-B large area fertiliser spreader ZG-TS large area fertiliser spreader Winter service spreader | | <ul style="list-style-type: none"> D9 mounted conventional seed drill AD pack top conventional seed drill AD-P pack top pneumatic seed drill Avant front tank sowing combination DMC Primera large area direct seed drills Cirrus large area sowing combination Citan large area seed drill Cayena tine seeders Condor large area direct seed drill | |

A total of 26 gold and silver medals at the previous eight AGRITECHNICA exhibitions show the high capacity for innovation of the AMAZONE Group.



| 1966 | 1969 | 1974 | 1985 | 1987 |
|--|---|--|--|--|
| Active soil tillage | Crop protection technology | Packer rollers | Municipal technology Electronics | Precision air seeders |
| <ul style="list-style-type: none"> RE reciprocating power harrow | <ul style="list-style-type: none"> US crop protection sprayer SF self-propelled sprayer | <ul style="list-style-type: none"> Tooth packer roller RP tyre packer roller | <ul style="list-style-type: none"> Groundkeeper mounted mower collector AMATRON on-board computer | <ul style="list-style-type: none"> ED vacuum precision single seeder |
| <ul style="list-style-type: none"> KG rotary cultivator KX rotary cultivator KE rotary harrow | <ul style="list-style-type: none"> UF mounted crop protection sprayer FT front tank UG trailed crop protection sprayer UX trailed crop protection sprayer Pantera self-propelled sprayer | <ul style="list-style-type: none"> PW tooth packer roller KW wedge ring tyre roller SW cage roller Knife ring roller | <ul style="list-style-type: none"> Groundkeeper mounted mower collector Profihopper self-propelled mower collector Landscape combinations Wide variety of on-board computers, such as, for example: AMATRON 3, CCI and AmaPad GPS technology, such as, for example: GPS-Switch, GPS-Track | <ul style="list-style-type: none"> ED vacuum precision single seeder EDX high output precision single seeder |



Chapter 1: Grain cleaners

In 1883 Heinrich Dreyer took over the workshop of his forefathers and registered his company for the factory production of agricultural machinery.

Previously his father, his grandfather and probably also his great grandfather had run a carriage workshop where also grain cleaning machinery had been individually manufactured.

Immediately Heinrich Dreyer initiated the development of a grain cleaner which was suited to efficient mass production and could also compete with other machines already on the market.

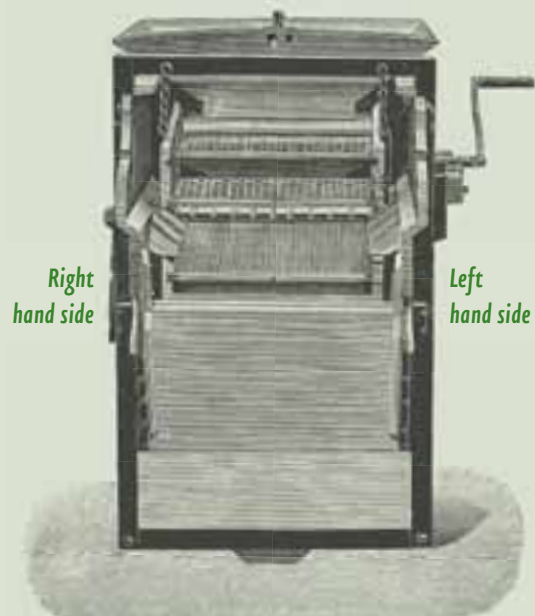
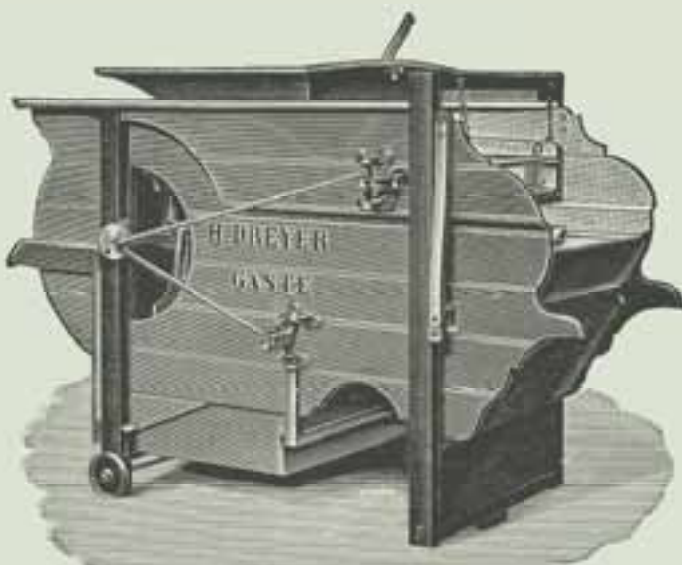
He referred to decades of experience and then in just a short time he developed a machine that

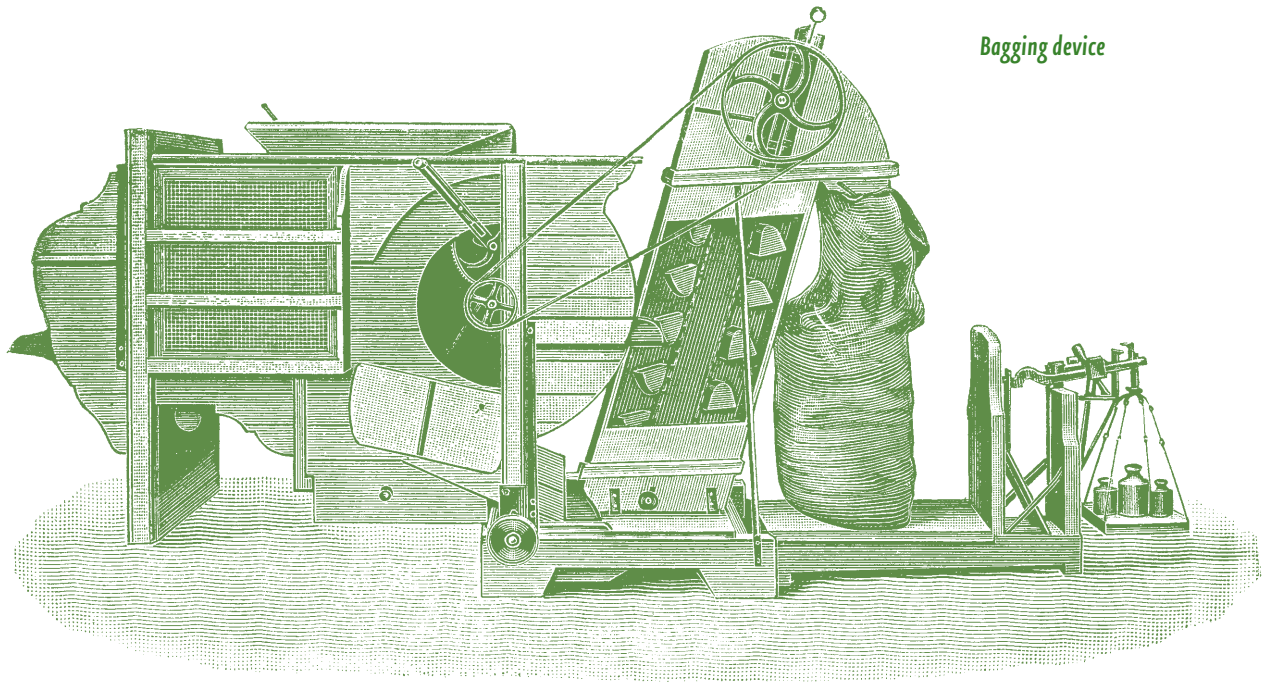


could not only clean cereals, but also sorted it leaving properly cleaned material without any small and broken grains, and thus just the cereal seed. For this machine he was awarded in 1891, at a major agricultural exhibition in Bremen, the prize: **Best machine.**

Thereupon he called the machine “AMAZONE” and registered the warrior girl on the horse as his company logo.

AMAZONE No. 1 – Drive to left hand side





Bagging device

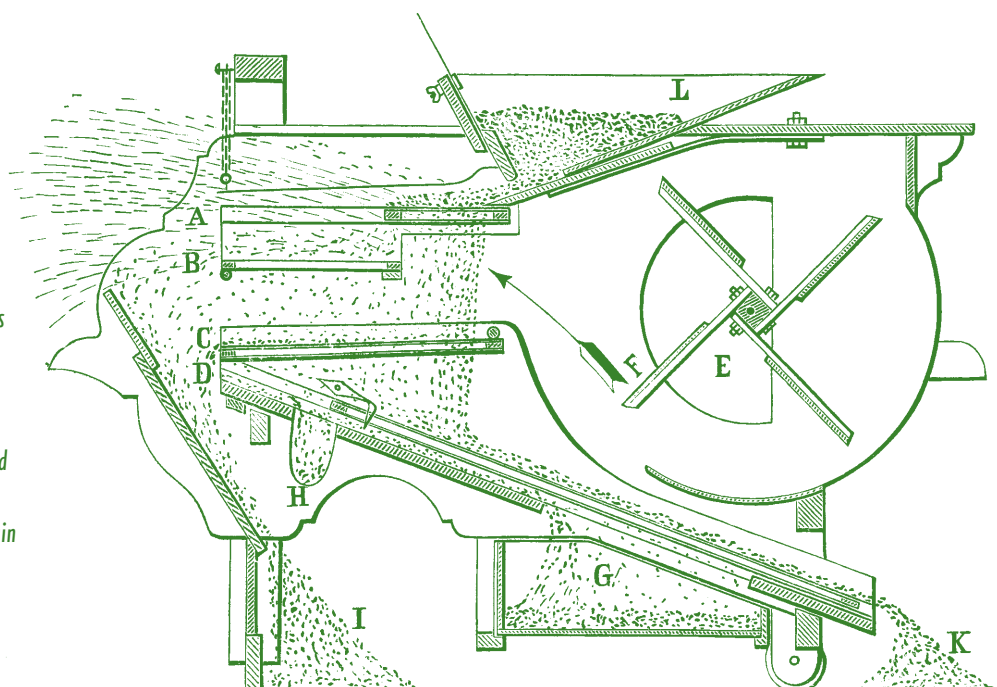
AMAZONE became an attractive product name and this encouraged Heinrich Dreyer to rename his company in 1915 as AMAZONEN-WERKE. In the course of the years the range of grain cleaners was further improved and supplemented by different sizes.

The sales success resulted in an extension of the production and even by the beginning of the 20th Century a comprehensive export business developed. 1906 – more than 100 years ago – the first grain

cleaners were exported to Valparaiso, Chile. Through this, and very early on, expansion appeared on the agenda, though initially this was limited to the establishing of a new clientele by showing at annual exhibitions. South America was the market serviced most regularly, an early precursor of the later international export horizons. In total, more than 200,000 grain cleaners and sorting machinery were produced up until 1960.

AMAZONE No. 1 – Cross-section

- A, B, C, D Range of sieves
- E Wind inlet
- F Fan blades
- G Box for separated weeds and finer grains
- H Channel for separated light grains
- I Storage for half ears and heavy greenery
- K Storage of the clean grain
- L Hopper for grain



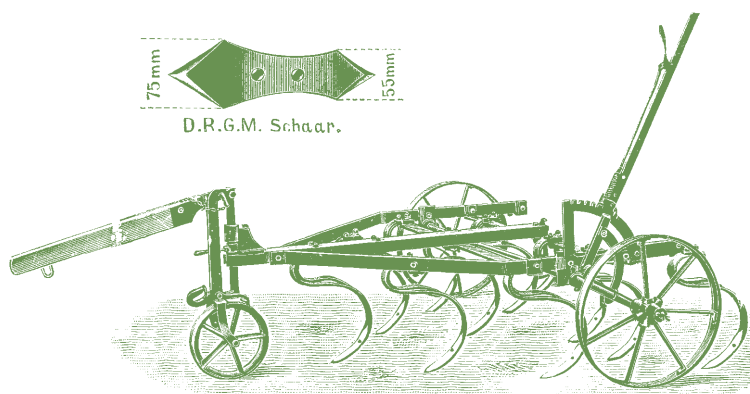


Chapter 2:

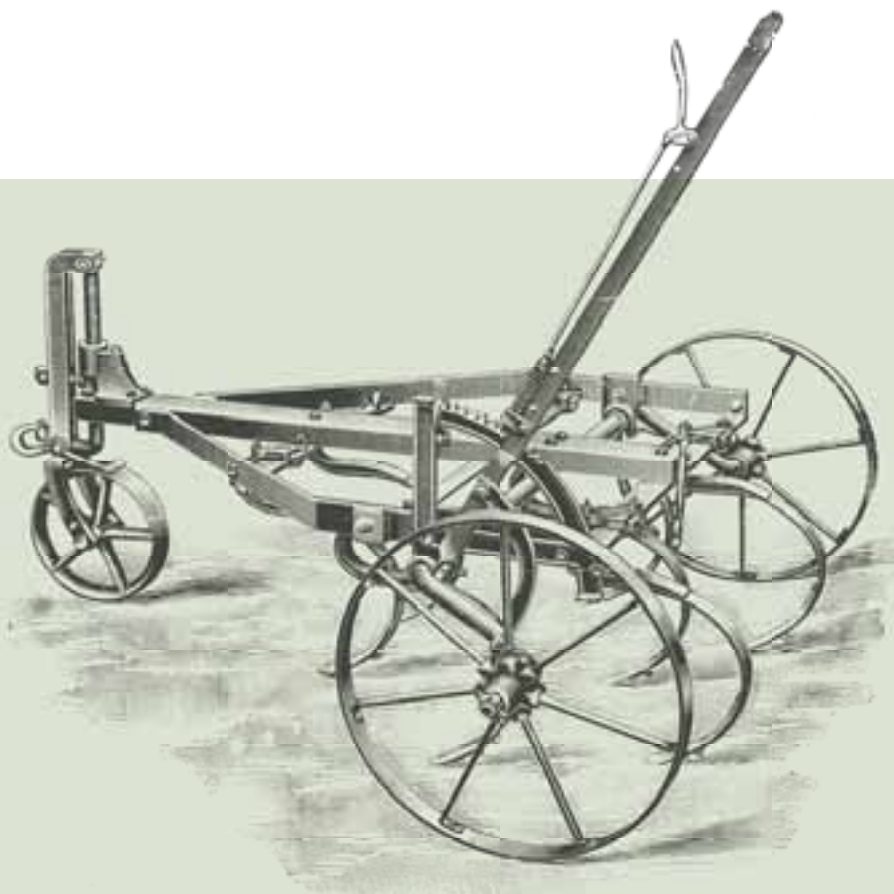
Passive soil tillage

a | Siegfried sprung tine cultivator

Today, very few people know that AMAZONEN-WERKE was already involved with passive soil tillage soon after their foundation in 1902. Heinrich Dreyer, the founder of the company, developed a very practical cultivator that was horse pulled and he had the idea to offer two different share widths by being able to turn the share. He had protected this invention by a German utility patent – [Deutsches Reichsgebrauchsmuster (DRGM)] and the Siegfried sprung tine cultivator became a success.



During the best years more than 800 machines were sold, in total many thousands. Only when business with the grain cleaners became more demanding did the founder give up the production of these cultivators and focussed development and production on his “AMAZONE” grain cleaners and the Federkraft potato sorters.



Sprung tine cultivator

b | Pegasus wing tined cultivator

With the political opening of the east, the former DDR and other former socialist countries, brought in many large farms with more than 5,000 hectares of arable land to become customers of AMAZONEN-WERKE. These farms demanded wide, passive soil tillage implements for their large acreages and the prevailing heavy tractors of 250 HP to 500 HP. Due to this demand, AMAZONE decided in 1998 to take over Messrs. BBG in Leipzig which traditionally had wide experience of passive soil tillage.

As the first product of its own in-house development, the Pegasus was designed – a mounted cultivator with two rows of cultivator tines with wing shares, followed by a row of discs for levelling the cultivated field and then a tooth packer roller. In this way, these big farms were able to carry out not only the shallow stubble work but also primary soil tillage and seedbed preparation. The machine was available in working widths of 3 m to 6 m, which from 4 m were also hydraulically folding. For stony conditions AMAZONE offered the “Revomat” stone safety device. The depth setting was done via the special AMAZONE square eccentric pin.



Pegasus with tooth packer roller

The AMAZONE Pegasus has proven to be very effective. It has also operated successfully abroad as far afield as Iran.

Pegasus with cage roller





Levelling discs



Wedge ring roller

c | Centaur tine & disc combination cultivator

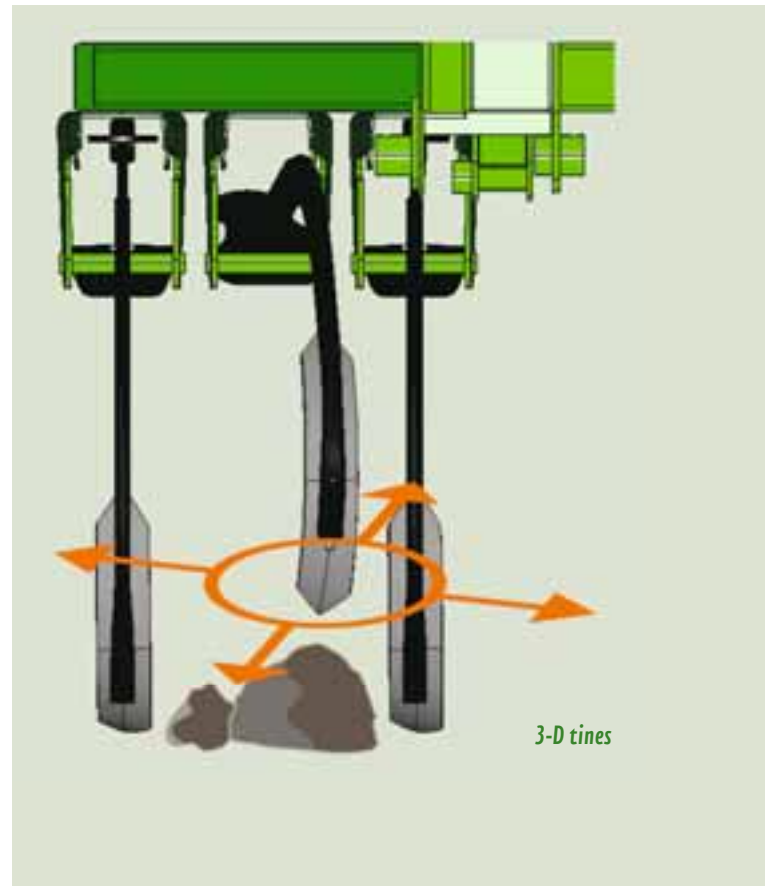
To meet the sophisticated demands of these larger farms, AMAZONEN-WERKE designed the Centaur, a tine and disc combination cultivator capable of shallow stubble work down to topsoil deep loosening. The Centaur is equipped with four rows of cultivator tines with large clearance followed by a twin-row disc harrow element for the optimised mixing of the soil and crop residues yet leaving a perfect levelling effect. For a good reconsolidation afterwards in most conditions, the superb wedge ring roller is used. This combination cultivator enables the trouble-free incorporation of even the largest amounts of straw. Depth control was via the press wheels at the front and the wedge ring roller to the rear and where the running rear is lowered for transport. The working width is simply set via the proven square eccentric pin.



Centaur

Today the Centaur cultivator combination is available in working widths of 3 m to 5 m, and from 4 m hydraulically folding. For the different soil conditions, the 3-D tines are available with quick-attach shares.

The Centaur performs an excellent job and the working depth can be matched via a GPS receiver and the appropriate programming to automatically adjust to the changing soil conditions. In 2001, the DLG awarded AMAZONEN-WERKE an AGRITECHNICA medal for this development. The Centaur is AMAZONE's soil tillage flagship.



Centaur with integrated running gear, wedge ring tyre roller and 3-D tines



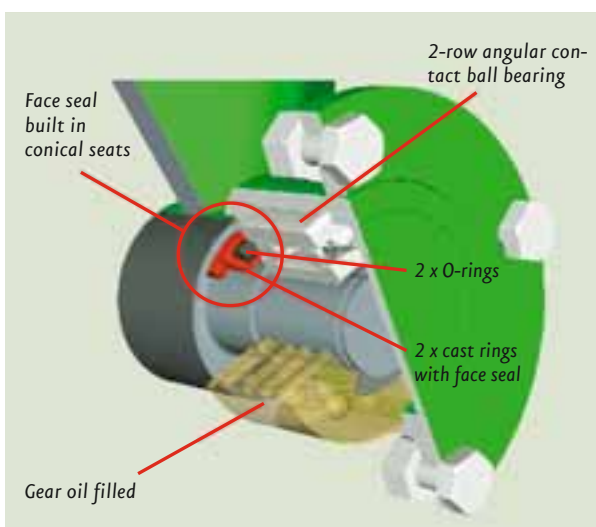


d | Catros compact disc harrow

To complement its soil tillage programme, AMAZONE initiated in 2000 the development of a compact disc harrow and called it Catros. In this regard AMAZONEN-WERKE had dealt itself a particularly fortunate “hand”. The Catros with its two rows of concave discs immediately impressed the customers by its extremely good mixing and levelling performance when stubble tilling and all this at a high forward speed with little pulling power requirement.

The demands on the machine are obviously high but, as standard, the harrow discs are protected from overload via spring rubber mounting elements.

They automatically negotiate obstacles in an upward direction and return to their operating position. They are skilfully angled for optimised



Maintenance-free bearings with slide seal. Stone safety via the sprung rubber mounting elements and the ability to set the machine without tools are characteristic of the Catros.

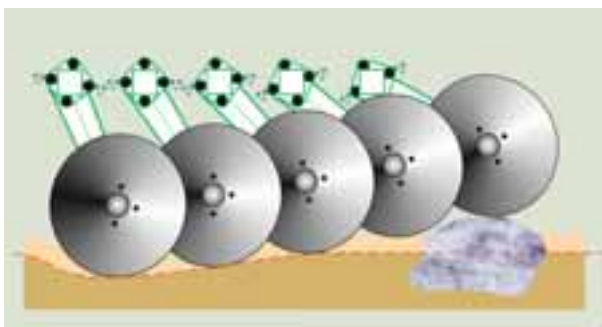
Catros with smooth discs





Catros with smooth discs

operation yet with a minimal power requirement. For reconsolidation and depth control in most cases the AMAZONE wedge ring roller is used. The mounted Catros is available in working widths of 3 m to 6 m and from 4 m also as hydraulically folding.



Practically-orientated in every detail: Ground contour adaptation of the individual disc elements including overload protection and stone safety device

Catros in transport position





Catros 7500-2T in operation

Since 2010, the Catros⁺ model is also available with 510 mm diameter serrated discs. This design makes the machine especially suited for operation in stubbles with heavy crop residues, for example after the maize harvest.

In the initial years the Catros was only offered as a mounted implement requiring tractors with quite a big hydraulic lift power. Since 2007, AMAZONE has offered its Catros compact disc harrow also in a trailed version; these are the Catros-T models from 3 m to 7.5 m. These trailed versions are equipped with wedge ring tyres or rollers, whereby these also serve as the running gear for road transport. In addition, the mounted Catros is available with an optional bogey chassis which is equipped with hydraulically liftable wheels resulting in an especially smooth run on the road. In the field, the chassis is lifted over the Catros-TS and thus increases the weight to reconsolidate the soil and to help the harrow discs penetrate.

Overall the Catros has gained an excellent reputation. Every compact disc harrow is equipped with an over-engineered bearing assembly as is found also on road construction machinery, making the Catros virtually maintenance-free. The bearings run reliably in an oil bath. The DLG testing laboratory in Groß-Umstadt thoroughly tested the 7.5 m Catros. There it was confirmed that the Catros performs an especially good job at forward speeds of up to 15 km/h and only requires a pulling power of 100 kW and just 4 litres of fuel per



*Catros⁺ with large serrated discs
(510 mm diameter)*



Catros 12000-2T compact disc harrow with coupling frame

hectare with minimal wearing costs. Now that is top performance.

AMAZONE offers the bigger working widths of 9 m and 12 m by using a coupling frame with a combination of either three 3 m, or four 4 m, Catros.



*Trailed Catros-2TS
with bogey chassis*



e| Cenius mulch cultivator

In 2005 AMAZONE developed the Cenius which is the “little brother” of the Centaur. It is equipped with three rows of spring tines with a large spacing, followed by a row of discs arranged in pairs for levelling the soil and a packer roller for the re-consolidation. This machine has been designed for light to medium soil conditions and is offered in working widths of 3 m, 3.5 m and 4 m. The Cenius, which operates with the so-called inversion shares, can cope with both shallow stubble work and also quick, medium-deep soil tillage for the quality mixing in of straw residues. The spacious arrangement of the tines ensures the cultivation of the field at high forward speeds without any blockage. The AMAZONE Cenius impresses with its simple, but very robust concept.

Cenius 3001 in work



Cenius 3002 with 3-D tines





Chapter 3:

Potato sorters

The major product of Heinrich Dreyer was, and remained so for a considerable time, the grain cleaner that he had called AMAZONE. For diversification, however, he also manufactured a host of other products, such as ploughs, cultivators, straw cutters, motor vehicles and butter making machines. In 1910, one design turned out very well and is worthy of a special mention in this book. Heinrich Dreyer had the idea to mount the sieve cassettes of the sorter on free running springs so that the 'to and fro' movement of the potato sorting sieves in their frames required hardly any power.



Heinrich called his new design "Federkraft" and the customers liked it so much that a big trading house in Osnabrück, Messrs. Hagedorn and Sander, immediately ordered 500 of these machines.

A patent was applied for this design and further developments made in the course of the years. The sorter then was not only offered in different sizes but additionally had a picking table, where

Patent for the potato sorter



ORIGINAL **Federkraft** FLACHSIEBSORTIERER

gehören zu den arbeitssparendsten Landmaschinen überhaupt, denn sie leisten ein Vielfaches der Handarbeit. Die bekannten „Federkraft“-Sortierer reinigen die Kartoffeln von Schmutz und sortieren sauber auf langen Sieben in drei verschiedenen Größen. Für die Verlesung der Kartoffeln liefern wir die konkurrenzlose Rollenverlesbahn mit der ununterbrochenen Wendung der Kartoffeln und den Rüttelverlesröhrchen.



Motorisierter „Federkraft-Sortierer“ mit Zahnring. Auf dieser Maschine werden bis zu 600 kg (130 Zentner) Kartoffeln in drei Stufen nach Größe sortiert, ganz sauber und abgerichtet, und zwar mit sehr wenigen.



„Federkraft“-No. 11 mit dem sphärischen Antrieb.



So machte man es früher! Mit der Maschine geht es einfacher und viermal schneller!

“Federkraft” horizontal sieve sorter



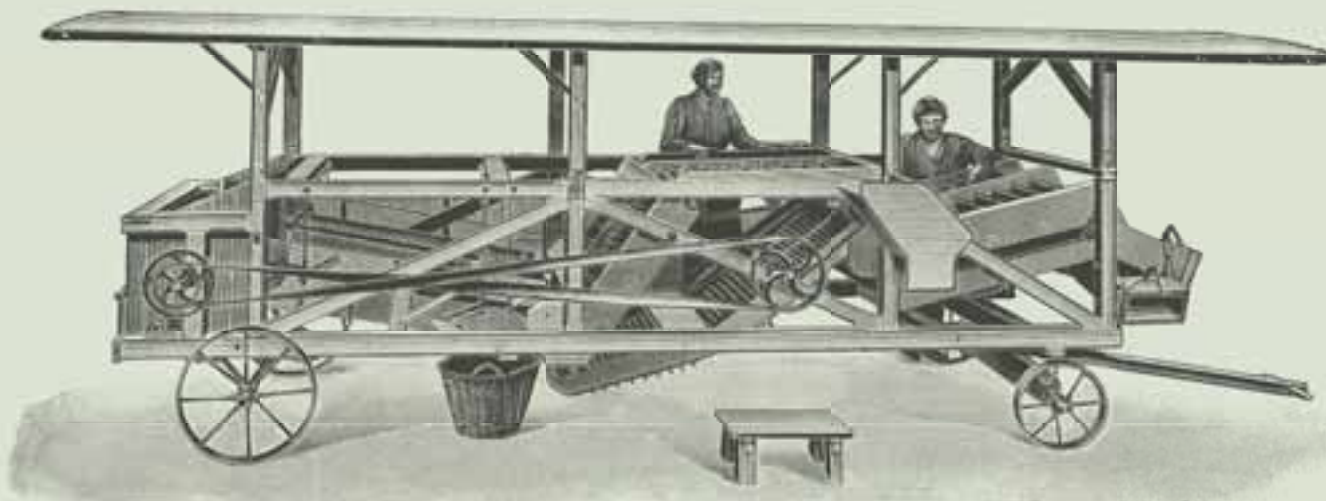
damaged, rotten and pre-sprouted potatoes and also stones could be sorted out by hand. Initially the picking table consisted just of rollers. However, this solution was technically very costly as every roller had to be driven individually in order to rotate and with it the potatoes. In addition it had the disadvantage that the constantly rotating potatoes confused the sorting staff.

Later the picking table was equipped with two belts and one roller rotating in between. So the potatoes were turned allowing them to be inspected also from all sides. Finally the picking table was provided only with a number of rubber fingers enabling the turning in the simplest way. In the course of the years the potato sorter developed into being such a good business that they temporarily became the sales mainstay of the company. The biggest plants, designed for agricultural storehouses, featured five different sieve sizes, a big picking table and conveyor belts for the delivery and the loading of the varying sizes directly into a cart or a wagon.

In the 1970s the potatoes then were mainly processed centrally whilst being lifted and so a potato sorter on the farm was no longer needed. In addition there were so many sorters on farms that the demand could be easily met by the second-hand machine market.

In the meantime the programme of AMAZONEN-WERKE had expanded to such a degree that the termination of the production of the potato sorter did not leave a gap.

Federkraft-Sekunda with canopy



Katalog-Beilage.

Kartoffelreinigungs-, Sortier- und Auslese-Maschine Patent Dreyers Federkraft

Modell 1913

Zum Reinigen, Sortieren
und Auslesen von Kartoffeln,
auch Äpfeln, Apfelsinen,
Zitronen, Rüben, Zwiebeln,
Nüsse.
Sand und Kies.

Außerdem auch Getreide
und alle Hülsenfrüchte.
Dazu Aufsetztrumpl und
besondere Siebe erforderlich.
Preis auf Anfrage.



Großartig verbessert!

Auszeichnungen:

Deutsche Landwirt-
schafts-Gesellschaft
Kassel im Juni 1911:
„Neu
und beachtenswert!“

Rom April 1912:
Einziger
erster Preis!
Probe nach Wunsch.

H. Dreyer, Gaste

Post Hasbergen bei Osnabrück
(Hannover)

Telegramm-Adresse: Amazonenwerk Osnabrück — Größtes Werk für Kartoffelsortiermaschinenbau.

12, 12, 5000.

With this potato sorter Heinrich Dreyer was the only one awarded 1st prize in Rome 1912.



Picking table



Chapter 4: Fertiliser spreaders

a | Michel box cart and worm auger fertiliser spreader

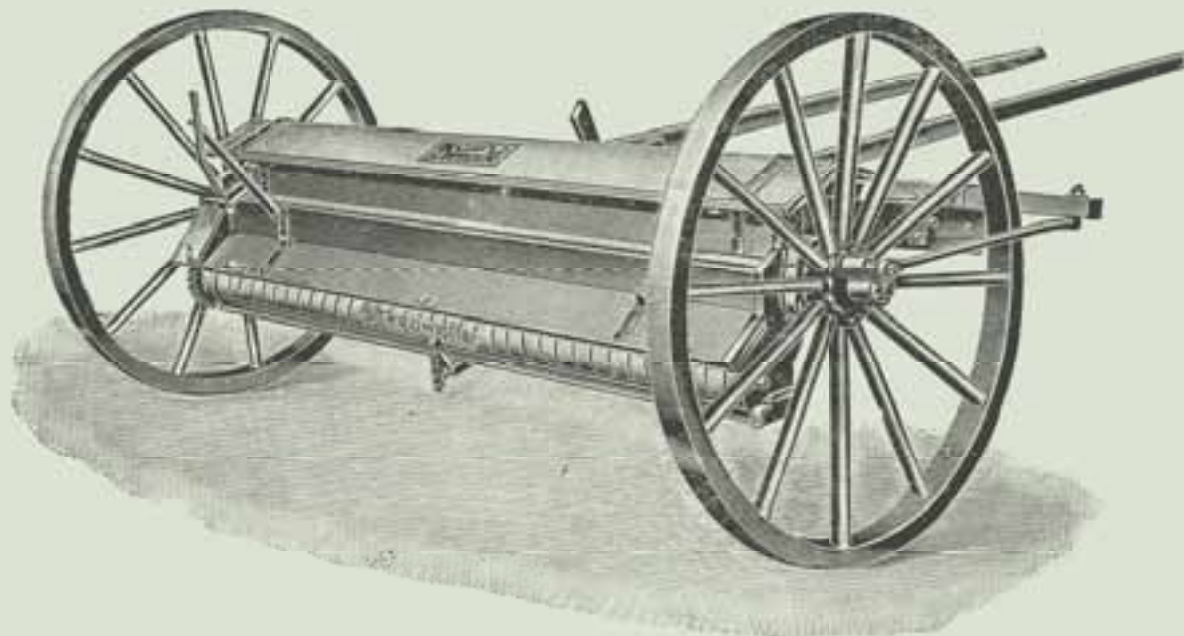
After the outbreak of the First World War in 1914, inevitably severe difficulties arose at AMAZONEN-WERK as in the German economy in general. A large part of the qualified young employees were called up for military service, material for the production of agricultural machinery was difficult to purchase and the sales of the finished machinery collapsed.

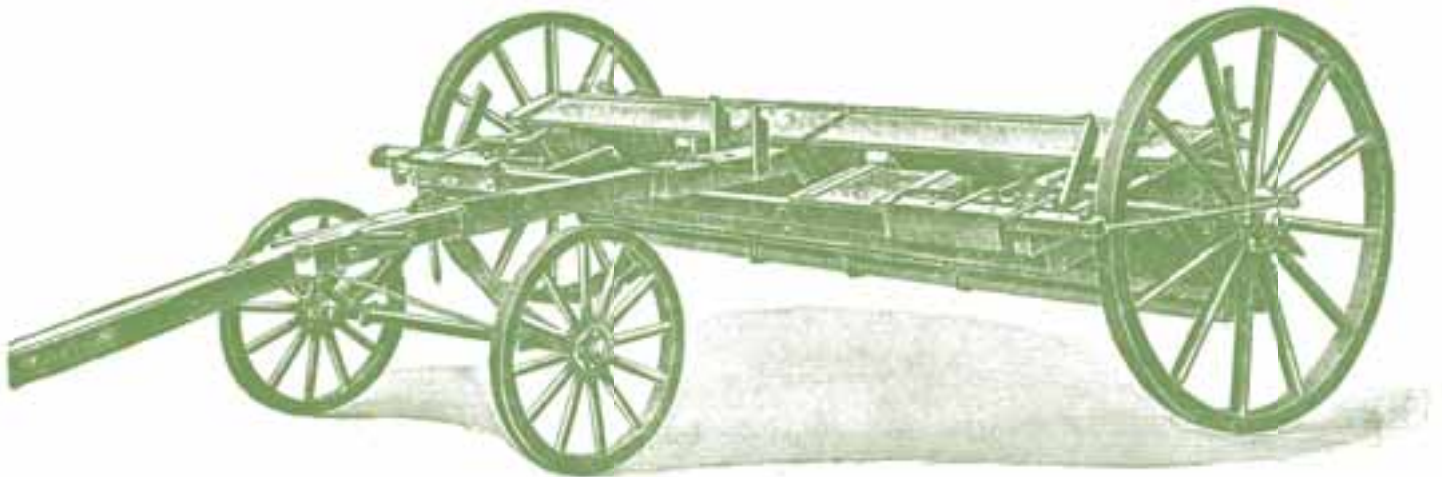
In this situation Heinrich Dreyer was wondering what to do to build up additional business and had the idea to develop a fertiliser spreader. At that time the standard was the box cart fertiliser spreader that



was used in big numbers. Although it worked well and reliably, it had the disadvantage of being very heavy and expensive so that only big farms could afford such a spreader. The small and medium sized farms still spread the fertiliser manually or used simple slit spreaders which, however, could only be used for dry fertiliser. At that time Heinrich Dreyer had a good idea and filed a patent application in 1915.

Michel 1 fertiliser spreader





Michel 3 fertiliser spreader

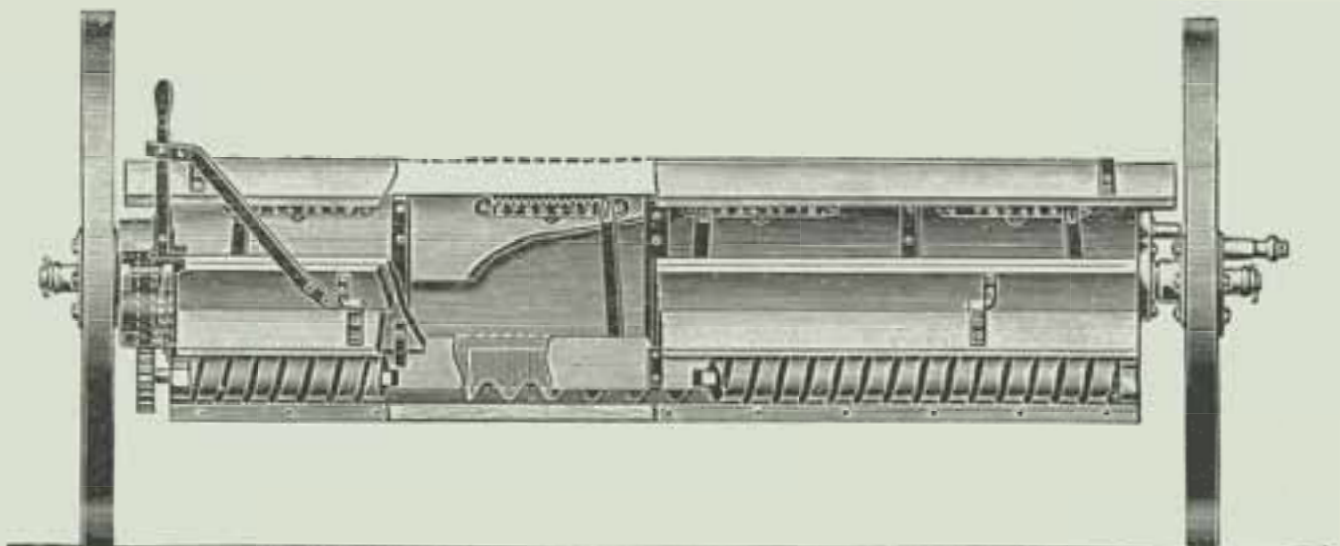
This was the worm auger fertiliser spreader. It took some time to develop the idea but from 1920 the first worm auger spreaders were successfully introduced.

Heinrich Dreyer called his worm auger spreader “Michel” (after the “German Michel”) and hoped for similar success with this as he had enjoyed with his “AMAZONE” and the “Federkraft”. The ingenious basic principle was: a box cart with an inclined base where a toothed “agitator slide” moved to and fro and which delivered the fertiliser underneath a shutter slide. The fertiliser then was distributed on the soil via an external worm auger.

This principle features the following outstanding benefits:

1. All kinds of fertiliser were evenly spread, no matter whether dry or moist, without any smearing of the spreader units.
2. The spreader was easy to tow and even simpler to clean.
3. There were only a few parts that could be affected by the aggressive fertiliser.
4. In addition the Michel could be produced at a lower price, so it could be also purchased by smaller sized farms.

Michel 2 fertiliser spreader





The name of the spreader changed several times from Michel in the beginning via Hadege and Hedega with it finally becoming the AMAZONE HDG (Heinrich Dreyer Gaste).

Of course, it was offered in different sizes from 1.5 m to 4 m and it was also available in a special execution with rubber tyres and equipped with a tractor drawbar.

From 1925, the AMAZONE worm auger spreader started its triumphal procession. Even large estates realised its benefits and increasingly decided in favour of AMAZONE. In the beginning of the 1930s, the successful development resulted in AMAZONE gaining the market leadership of the fertiliser spreaders as it already had with the grain cleaner and potato sorting machines. Consequently, the principle of the worm auger distributor was copied by several other manufacturers.

In 1936, the second generation of the Dreyer family then joined the company. They were Dipl. Eng. Heinrich Dreyer and his brother, trader Erich Dreyer. Heinrich Dreyer continued the development of the fertiliser spreaders and invented the double AMAZONE BM (mountain machine) worm auger spreader, which addressed the disadvantages of the worm auger spreader in hilly terrain.

Erich Dreyer meanwhile took care of sales and reached the point then that farms in East Germany also decided in favour of purchasing AMAZONE machinery.



The Hadege worm auger spreader further developed by Heinrich Dreyer

AMAZONE HDG mineral fertiliser spreader



Antrieb des Rührschlebers. Keine Wechselräder — Verstellung auch während der Fahrt. Dadurch ist die Anpassung an die jeweilige Düngerschichtdicke möglich.



Mit 3 Handgriffen sind Streuwalze und Rührschleber herausgenommen, ohne Anwendung eines Schraubenschlüssels.



Blick in den einfachen Streukasten. Die Streurechen (rechts) sind für feuchten Dünger bestimmt und werden nur eingehängt.

Nr. 268 S. 33.

AMAZONE HDG

KUNSTDÜNGERSTREUER

MEHRERE PATENTE



**WEITERE
SPEZIALITÄTEN:**
 Getreideeinger und
 Windfegen
 „Amazone“
 Kartoffelsortierer mit
 u. ohne Verleseband
 „Dreyers Federkraft“
 mit Flachsleben und
 „Dreyers Batate“
 mit Trommelsieben,
 Früchtesortier- und
 Verlesemaschinen für
 Tomaten, Zwiebeln,
 Äpfel usw.
 „Dreyers Standard“



Amazonenwerk H. Dreyer

M. B. H.

GASTE P. HASBERGEN B. OSNABRÜCK

AMAZONE HDG artificial fertiliser spreader

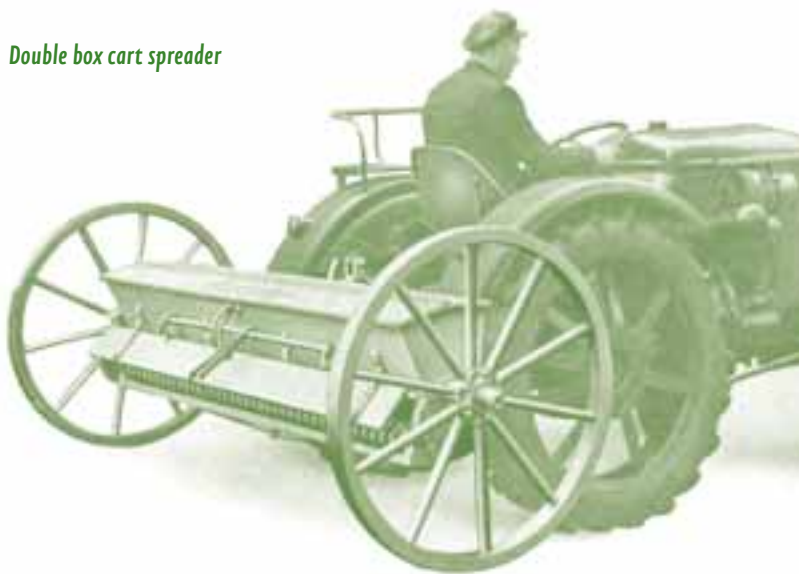


Another stage of development for the worm auger spreader was the double box cart spreader, also called the two type fertiliser spreader, which made it possible to spread Thomas slag and potash salt, for example, in one pass. This was introduced after the war in 1945.

In 1958, after the death of Dipl. Eng. Heinrich Dreyer – his brother Erich already died in the war in 1945 – the third generation of the Dreyer family appeared on the scene. These were Prof. Heinz Dreyer and his cousin Dipl. Eng. Klaus Dreyer. The latter took care, amongst other matters, in the further development of the worm auger spreader and initially built a light version, called AMAZONE L and BL and then also a two type version of the light spreaders, called AMAZONE LZ.

Overall, the worm auger spreaders, with their different models, could again noticeably be seen to increase the market share of box cart spreaders prior to the centrifugal broadcasters' introduction to the market and which gradually replaced the box cart spreaders. But, even so, they were still produced until 1990.

Double box cart spreader



Tractor fertiliser spreader with small rubber tyres



Schmotzer with fertiliser spreader



AMAZONEN-WERKE

**WALZEN
DÜNGERSTREUER**

für alle
Düngersorten
hervorragend
geeignet

D 400 * 2. TN

AMAZONE LZ two type fertiliser spreader



b | Twin disc fertiliser spreaders

In 1958 the second change of generation took place at AMAZONEN-WERKE. After the early death of Erich Dreyer and his brother Dipl. Eng. Heinrich Dreyer, the third generation took over the responsibility for the enterprise.

This was Dipl. Eng., Dipl. Eng. Univ. Prof. Heinz Dreyer and his cousin Dipl. Eng. Klaus Dreyer. At that time the fertiliser spreader market was strongly characterised by the emergence of centrifugal broadcasters. By then AMAZONE, with its classic worm auger spreaders, tried to restrain the flood of single disc and pendulum spreaders.

Prof. Heinz Dreyer set about developing an alternative. He quickly had the idea of the modern mounted spreader with two spreading discs which turned out to be a resounding success.

The concept was apparent to everyone immediately: The two opposing discs balanced one another with the four spreading vanes dividing the spreading operation into roughly four quarters. This made a spreader which spreads at an equal distance to the right and left hand and which offered half-side spreading by switching off one side. Thanks to a powerful agitator, even spreading moist potash was possible.

The ZA centrifugal broadcaster, initially with a capacity of 330 l and a working width of approx. 9 m quickly followed. With this machine AMAZONEN-WERKE quickly recovered lost market share and, after just a few years following the introduction of the ZA, customers requested bigger working widths and more capacity. AMAZONE responded to this request quickly and so, by the beginning of the 1970s, a complete twin disc spreader programme was offered ranging from the 200 l vineyard spreader, via the 250 l AMAZONE ZL for small sized farms and the 600 l spreader, right up to the 1,000 l spreader for larger sized farms.



ZA twin disc fertiliser spreader

D 393 * 3. 43

Der neue



Zentrifugalstreuer **AMAZONE ZA**

mit zwei Streuscheiben,
die sich gegenseitig ausgleichen!



Der **AMAZONE ZA** wurde auf dem Prüffeld in Wageningen (Holland) für das Ausstreuen von pulverigen, feuchten und körnigen Düngern mit eindeutig unerreicht gutem Resultat geprüft (Okt. 1959).

Eine gleichartige Prüfung wurde auch in England durch das N.I.A.E. zu Silsoe durchgeführt (s. N.I.A.E. Prüfungsbericht Nr. 329). Die Maschine zeigte eine gute Streuarbeit bei den gebräuchlichen Düngersorten einschließlich gekörnter und kristalliner Sorten sowie Thomasphosphat und Kalk. (November 1962.)



ZA spreader series

For larger farms and agricultural contractors, AMAZONE in meantime had developed the so-called trailed large area spreader in two sizes. These were the ZG 5000 and the ZG 8000, the latter was available on special request with a tandem axle.

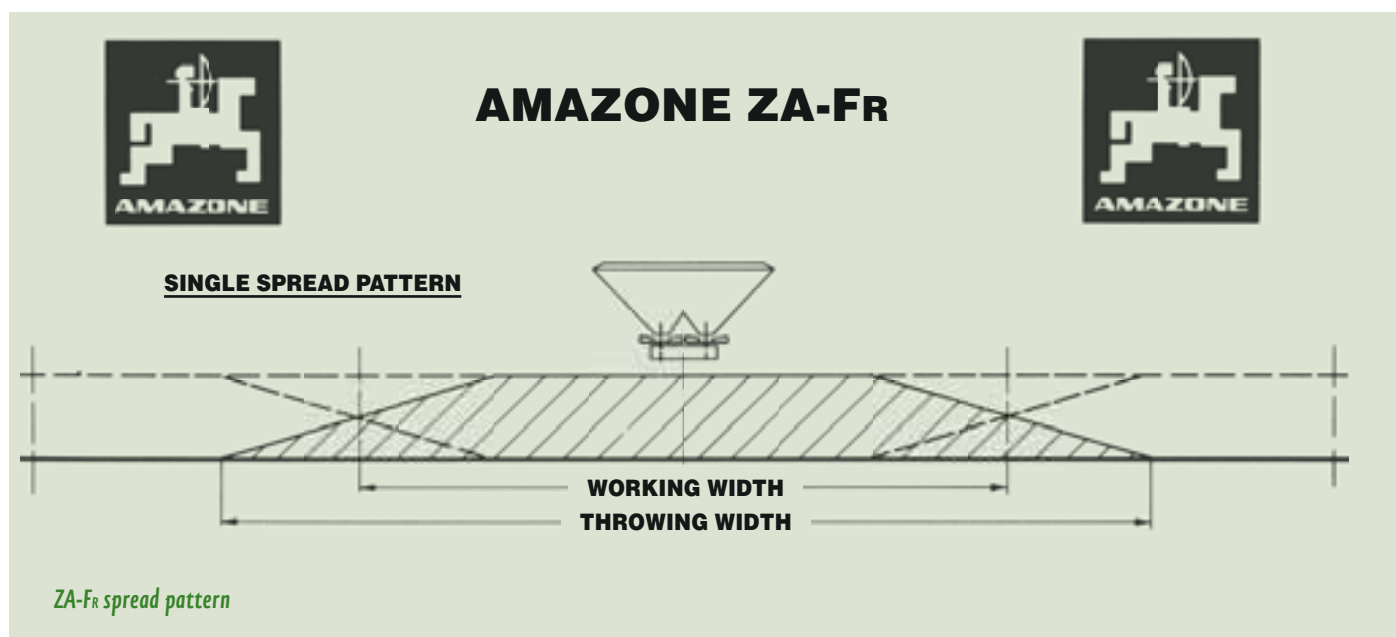
The spreading width could be gradually increased up to 15 m and both spreading discs were switched on and off with just one lever.

Meanwhile the success of the AMAZONE ZA was enormous. By the middle of the 1960s about 35,000 spreaders were produced per year and the market share in Germany moved to the 75 % mark. Also the technology did not stand still. The ZA became the ZA-S and from this the ZA-E was derived and finally the ZA-F was born.

Now the standard machine featured a very specific shape at a height of only 87 cm and a straight edge in the rear for easier loading from a tipping trailer. The agitators were provided with a detachable head so that urea was not broken up. For the late top dressing of cereals AMAZONE offered the late top dressing coupling frame allowing spreading still in 1 m high crops without damaging the ears. Meanwhile the switching on and off could also then be carried out hydraulically.



ZA-F twin disc fertiliser spreader

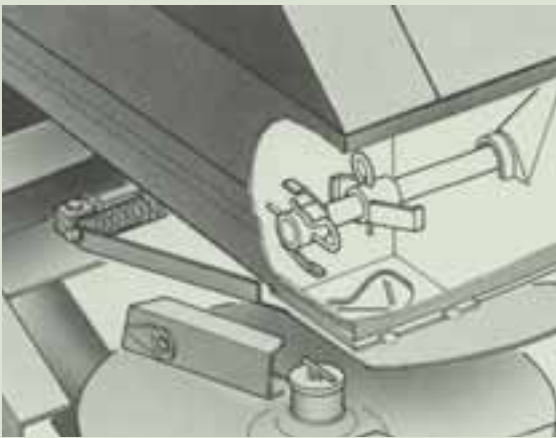


ZA-F 804 twin disc fertiliser spreader





ZA-U 1001 fertiliser spreader

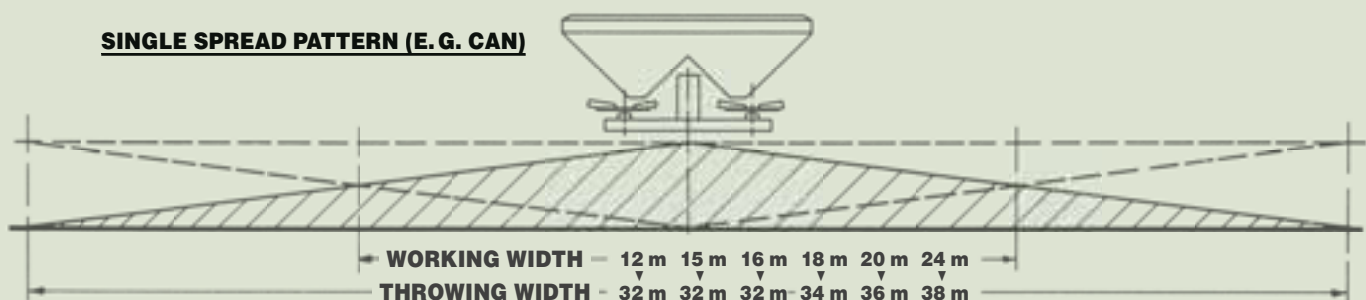


Agitator shaft with removable agitator fingers

In 1982 AMAZONEN-WERKE made a huge step forward with the introduction of the ZA-U. Its main feature was the extended range of spreading discs with correspondingly longer spreading vanes. Thus the ZA-U was able to achieve a working width of up to 24 m. Different working widths for the fertiliser types were possible by the use of different, removable spreading discs. For border spreading, special border spreading discs were available. Meanwhile another philosophy had been developed for the distribution. The individual spread pattern should no longer be short and abrupt, because this resulted in difficulties when driving the next bout. The new spread pattern had a more triangular shape with a very shallow tail off that was made complete only after driving the next bout. The challenge for AMAZONEN-WERKE was that any deviations in the spread pattern should be no bigger than 10 % at a maximum. The drive of the spreading discs was still carried out directly from below, whereas the agitator drive for the AMAZONE ZA-U was from the centre via a chain so that the fertiliser was gently and slowly delivered in mirror image to the spreading discs.

This became a huge success which is confirmed by the many thousands of spreaders sold. Still today, after 25 years, the ZA-U is traded at a high price as a second-hand machine. The AMAZONE ZA-U was available with capacities of 1,000 l up to 1,800 l.

ZA-U spread pattern



Another “highlight” in the development of fertiliser spreader technology was the so-called swivel blade for late top dressing in cereals. For this purpose, and still applicable today, the spreading vanes have at their end a swivel blade, which can be simply swivelled by hand and set into operation. So the entire spread pattern is raised by about 500 mm and this eliminates the need for a high lift frame for late top dressing. This patented invention proves itself superbly still today.



ZA-U 1501 twin disc fertiliser spreader





In 1990 the design of the successful ZA-U was superseded once more. This year the first AMAZONE ZA-M appeared. Its outstanding feature was a maximum working width of 36 m. The operation was neutrally tested and in all the tests it received 'very good' and 'good' assessments. The distribution principle of the ZA-M includes three different sets of spreading discs. The different spreading properties of the different fertilisers were balanced with the simple adjustment of the spreading vanes. For a modern solution to border spreading and which was controlled remotely from the tractor cab, AMAZONE developed the Limiter border spreading device which was awarded an AGRITECHNICA silver medal. This modern, high-quality spreader still maintained the principle of the two spreading discs founded on the AMAZONE ZA.

The capacity of the ZA-M ranged from 1,000 l to 3,000 l by using different extensions. With its well-shaped frame and hopper this spreader soon found many friends. For the smaller sized farms AMAZONE still has a smaller spreader in its programme, the AMAZONE ZA-X Perfect and which also achieves a working width of 18 m.

From 2001 the ZA-M had many emerging siblings such as, for example, the ZA-M Profis Hydro with weighing system and hydraulic drive, the ZA-M Ultra with a working width of up to 52 m and the ZA-M Ultra Profis Hydro with weighing system, hydraulic

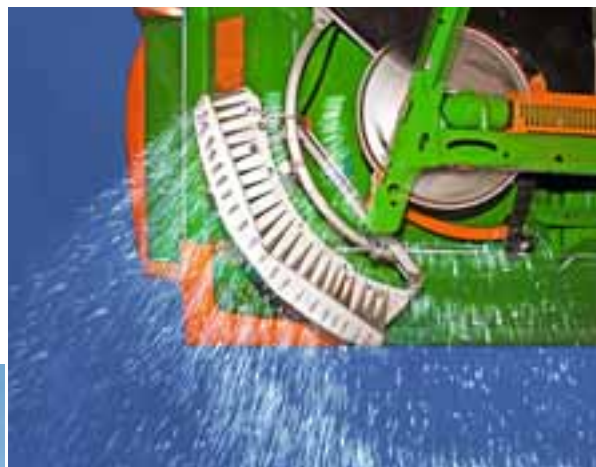
ZA-M twin disc fertiliser spreader



OM OmniaSet spreading discs



When border, or field side spreading, no stopping the PTO or leaving the tractor is necessary, thanks to the hydraulically remotely controlled Limiter border spreading device.





drive and a working width of up to 52 m. Maximum hopper capacity on the Ultra being 4,200 l.

All spreaders are electronically regulated and controlled via the on-board computer. Those parts which are subject to especially heavy wear are made from stainless steel. After many years the AMAZONE twin disc principle became so widely accepted that it is also offered by other manufactur-

ers but meanwhile more than 1 million AMAZONE fertiliser spreaders have been sold all over the world.



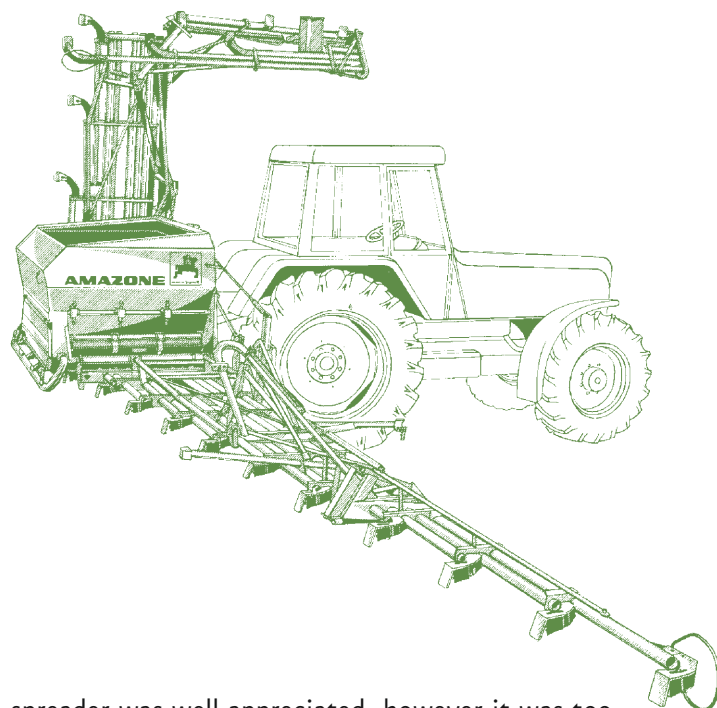
ZA-M Ultra



c| Jet pneumatic spreaders

In 1976 AMAZONEN-WERKE initiated the development of a pneumatic fertiliser spreader. The reason was that the French company Nodet had introduced such an implement to the market which was extraordinarily successful. Pneumatic fertiliser spreaders came into vogue and thus AMAZONE, as the market leader, was not allowed to stay outside. The principle of the pneumatic spreader is a fertiliser hopper with a metering device, similar to a conventional seed drill. The metering wheels charge the different tube lines which are provided with air by a separate blower fan via an injector sluice. The air delivers the fertiliser to the single nozzles which are attached to the relevant pipe on spacings of approximately a metre over a total width from 10 m to 24 m. This principle offers the advantage that the fertiliser is precisely metered and, due to the many nozzles also very evenly distributed in the field and this is also relatively uninfluenced by the wind. The disadvantage of the pneumatic spreader is that its design is very sophisticated and thus rather susceptible to faults and it is costly.

The AMAZONE Jet 1500 pneumatic spreader was designed very shallowly with a large hopper opening and so could be filled easily, even directly from a tipping trailer. Right from the beginning the



spreader was well appreciated, however it was too heavy and of a complicated design so that it could not be produced economically. A reworked version followed, the AMAZONE Jet 1200 where all the disadvantages of the Jet 1500 were overcome. This practical pneumatic spreader was designed very skilfully and well. Until 1995 up to 1,000 machines were sold per year. Unfortunately the Jet 1200 suffered from a few technical faults.

Jet pneumatic spreader





Jet pneumatic fertiliser spreader

These faults heavily affected sales and finally resulted in the termination of production. Fortunately in the meantime the AMAZONE twin disc fertiliser spreader had become so good that it filled the gap and AMAZONE did not lose any market share.

The AMAZONE Jet 1200 had a working width of 10 m and 12 m and could be increased from 1,200 l to 1,500 and 2,000 l via extensions.

In 1984 the little AMAZONE Jet got a big brother, the AMAZONE Super Jet with working widths of up to 24 m. This spreader did not only work perfectly but also reliably. However, it was so expensive that the customers changed sides when they could buy the AMAZONE twin disc spreader which featured working widths of up to 36 m and which were considerably cheaper.



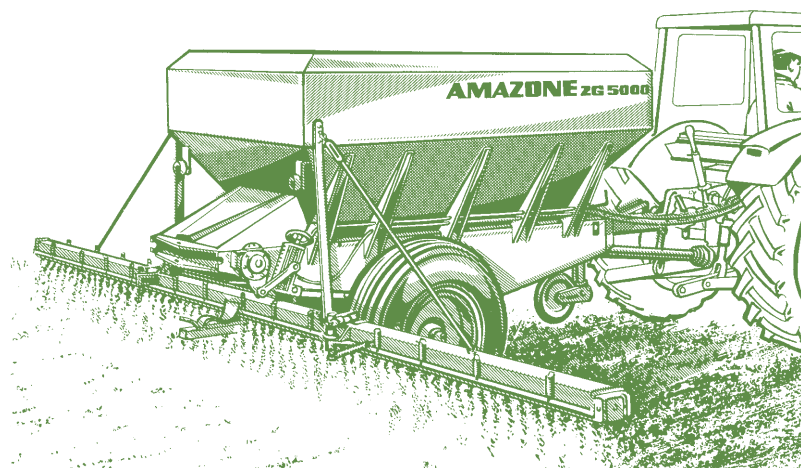
Super Jet pneumatic fertiliser spreader, 24 m



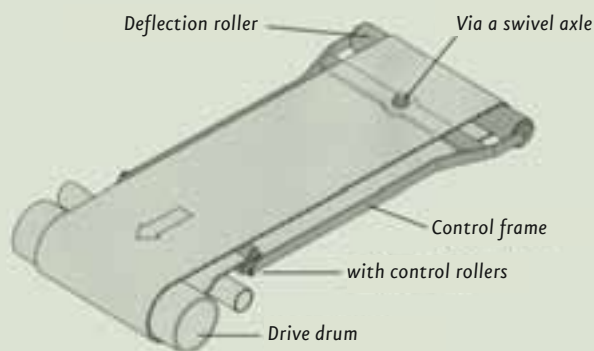
d | ZG and ZG-B large area spreaders

The large area spreaders from AMAZONE developed into a significant revenue volume. For the transportation of the spreading material, especially lime and limestone clay, a sheet metal bottom with scraper bar was used in the ZG. This system conveyed all materials safely and deliberately to the spreading unit at the rear, either a twin disc spreader unit or a 6 m spreading worm auger for lime.

However, foreign obstacles such as bricks could get into the spreading material. This happened especially when the spreader was filled via a front loader shovel. In this case the so-called “scraper



ZG 5000 with worm spreading auger



Mode of function of the automated floor belt control at the ZG-B

bottom” was bent and the spreader had to be emptied by hand and be repaired. In order to avoid such damage AMAZONE developed the floor belt and since then the spreader has been known as the ZG-B. The floor belt consists of rubber and is not damaged, even by bigger foreign particles. However, such floor belts, which are also used by other manufacturers, tend to drift one way or the other resulting in a bigger wear at the sides.

In order to avoid such damage on the spreaders, AMAZONEN-WERKE has designed a patented frame which automatically keeps the conveyor belt of the ZG-B in the centre. This solution proved ideal over the years and represents one of the most important benefits of the AMAZONE large area spreader. Today,



The ZG-B family



AmaPad with HeadlandControl ... for complex tramline systems

HeadlandControl for the optimised border spreading with centrifugal spreaders

the ZG-B and the ZG-B Ultra Hydro are offered in two sizes: 5,500 l and 8,200 l and with the twin disc spreader unit the fertiliser can be applied up to working widths of 52 m. Also the large area spreader is an important success for the company.

At the AGRITECHNICA 2011 AMAZONE presented the new ZG-TS with its integrated electro-mechanical AutoTS border spreading system and the new AmaPad ISOBUS operator terminal, allowing

the operation of the two AgApps WindControl and HeadlandControl for which AMAZONE was awarded two silver medals.

ZG-B Ultra Hydro large area spreader





e | Winter service spreader

For the de-icing of our roads or to prevent ice formation, for many years' special spreaders for the application of salt, sand, grit or also mixtures of these materials are used. The physical demands on such spreaders are very similar to those of mineral fertilisers in agriculture. So it is obvious that AMAZONE can already cope with this matter.

Of course, such spreaders are also suitable for the even distribution of mineral fertilisers on different green areas within the community such as golf courses, playing fields or similar.

For these tasks the EK-S and E+S single disc spreaders from AMAZONE are used.



EK-S single disc spreader

AMADOS E+S regulates the spread rate depending on the forward speed, changes the working width and automatically matches the application rate.



The spreading of grit requires an especially strong agitator and for the spread width reduction a so-called spread deflector with baffles can be lowered with the aid of a rope or also via an actuator from the tractor. Over the years these spreaders from AMAZONE have also gained an excellent reputation and are sold in increasing numbers.

EK-S 260 winter service spreader





Without conversion the E+S AMAZONE spreader becomes a sand application machine evenly incorporating sand into the lawn. An additional sweeping and raising the blades of grass is not necessary.



E+S 750 winter service spreader



Chapter 5:

Potato harvesters

In 1942 Dipl. Eng Heinrich Dreyer, one of the successors to the founder, developed the first potato harvester that was manufactured in a factory. The potato harvester became his passion and Heinrich went on developing it until he died.

The principle of the first harvester was thus: a spinner delivered the potatoes into a big drum which rolled over the ground in a frame. In there the potatoes were conveyed forwards via guide flaps and most of the earth was removed. At the end of the drum conveying blades were mounted which delivered the flow of potatoes upwards and deposited the crop onto a vibrating sorting table where the rest of the earth could be sieved and

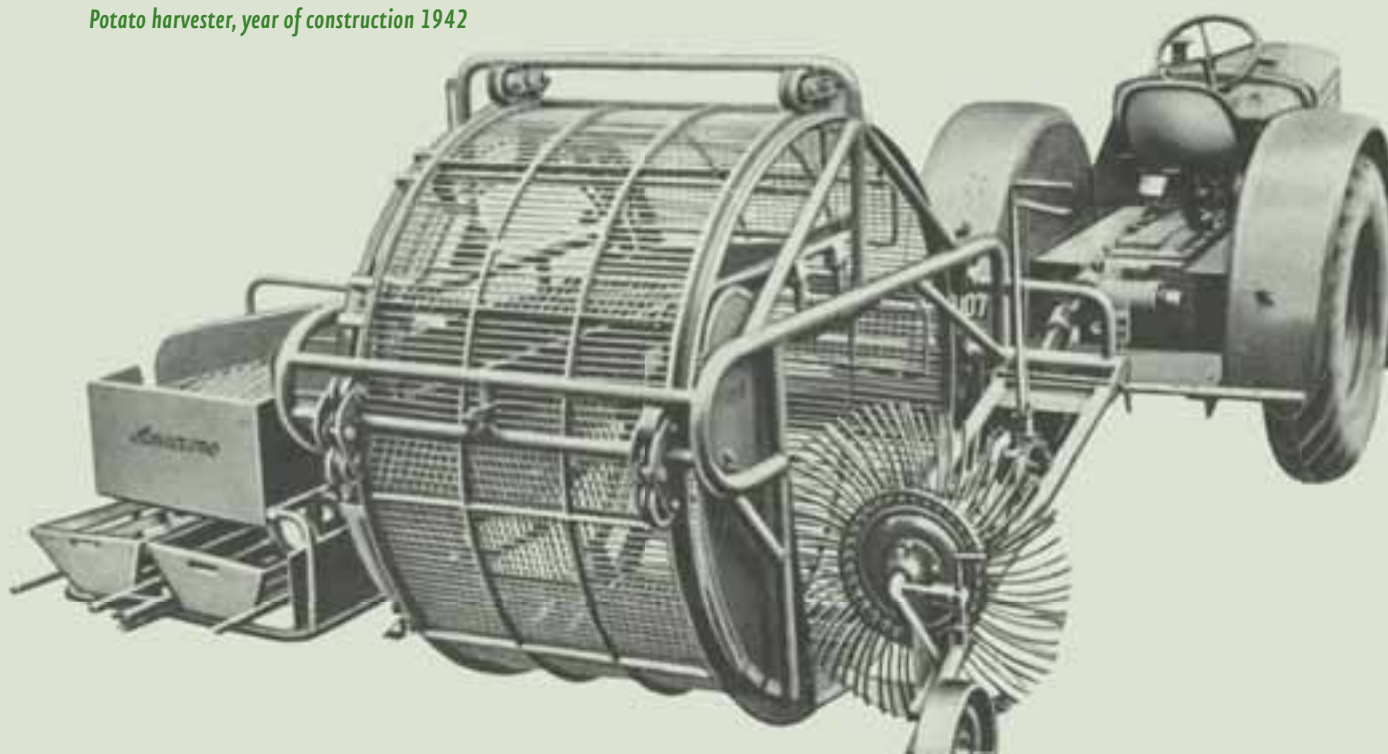


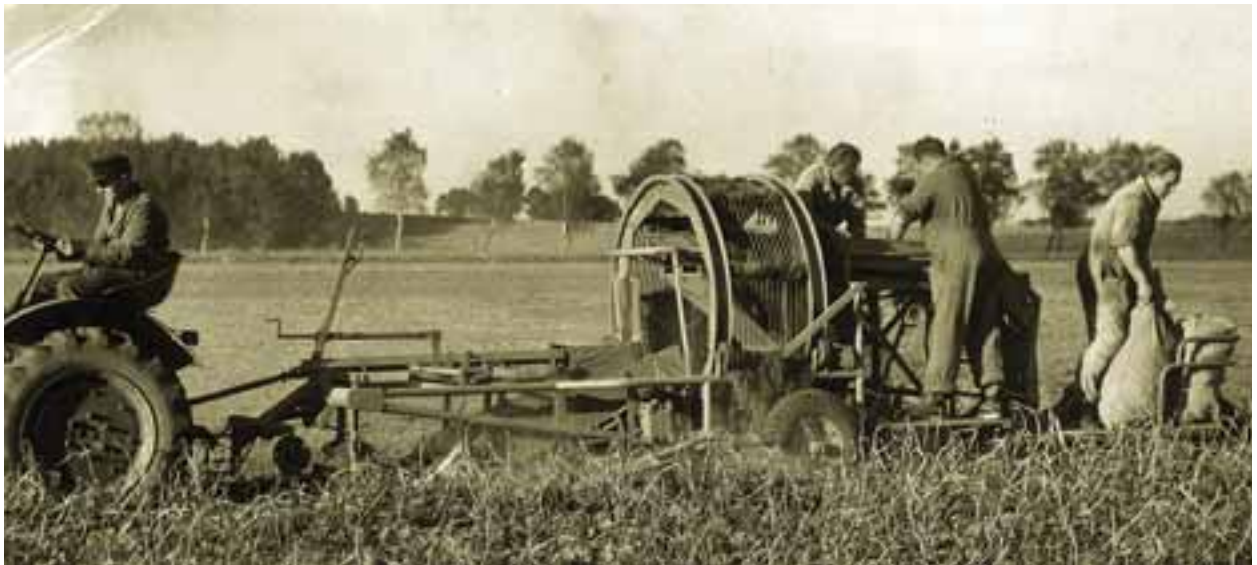
Potato harvester

the potatoes were deposited in a container. At the vibrating sorting table two people could sort out by hand any weeds, stones and seed potatoes. The harvester worked; however, it was quite wide and required a large headland.

The next improved version of the AMAZONE harvester was the type S4 where the drum rotated in a transverse direction in a frame and was loaded from the front via a conveyor belt. The potatoes were dug up with the aid of two share units and

Potato harvester, year of construction 1942





AMAZONE S 56 potato harvester

shifted onto the conveyor belt. This design made the harvester much narrower and the drum could sieve the earth better.

The further development of this principle resulted in the successful AMAZONE S 56 harvester, which was produced in larger numbers and which achieved market leadership in 1957. Unfortunately at the end of this year Heinrich Dreyer died and his son, Prof. Heinz Dreyer, took over his love for the harvesters and designed new functional models.

By that time, however, the remaining production programme of AMAZONEN-WERKE was so successful that it was decided to no longer produce a potato harvester at AMAZONE. In hindsight this was actually a pity!

Potato harvester





Chapter 6: Seed drills

a | Cam wheel seed drills

In 1948 Dipl. Eng. Heinrich Dreyer, the second generation of the Dreyer family, decided to start the development of a seed drill. The initial spark came from a certain Mr. Kademmann, who owned the patent for the “Elite seed wheel”. It was a cam metering wheel, combined with a fine metering wheel. The cam wheel can be switched off simply via a pin so that only the fine seed wheel (for carrots, clover, grass and turnips) remains in action. This invention was of special interest for Northern



Type D1 seed drill

Germany where it was common practice to grow turnips as a catch crop and winter fodder for cows. The common seed drills at that time had to have all the metering wheels exchanged for sowing fine seeds, resulting in quite a big effort.

AMAZONE D1 seed drill (prototype)



AMAZONE



The illustration features the Amazone Type D3 seed drill, a four-wheeled machine with a large hopper and a complex row of furrows. A circular inset shows a white silhouette of a horse-drawn drill against a yellow background. Another inset shows a close-up of the 'Elite' seed metering mechanism. The background is a green field with a yellow sunburst shape behind the machine.

Eine neue Drillmaschine
TYPE D 3
mit ›Elite‹-Särad

Ein AMAZONE Fabrikat mit
besonderen Vorteilen

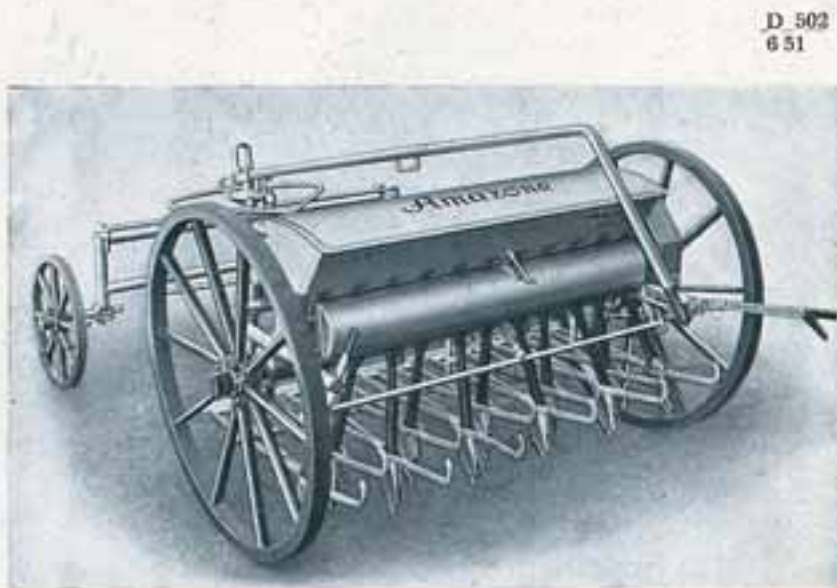
DI 705 B 54

Type D3 seed drill



The development started with the AMAZONE D1, which – for price reasons – was equipped with small rubber tyres. However, these proved to be too small and consequently the following model, the AMAZONE D2, introduced the classic narrow, high wooden wheels. However, a very costly gearbox was installed making the seed drill too expen-

sive and difficult to operate. Subsequently the AMAZONE D3 was built with a simple and very easy to handle so-called “Norton gearbox”. This seed drill was well accepted by farmers and in the following years it was sold in numbers of nearly 1,000 per year.



Drillmaschine **AMAZONE D 2**

mit normalen Holzrädern
mit Automobil-Steuerung

Außer den luftgummibereiften Drillmaschinen fertigen wir auch solche mit normalen Holzrädern an, die mit Rücksicht auf die hohen Gummipreise zu empfehlen sind.

Es ist uns dabei gelungen, durch Anwendung moderner Konstruktionsgrundsätze das Gewicht der Maschine gering zu halten, während die neuzeitliche Stahlbauweise eine gute Stabilität verbürgt.

Diese elegante und zweckmäßige Bauweise wird der AMAZONE-Drillmaschine

neue Freunde

gewinnen. Auch besitzt diese Maschine die Einzelaufhängung der Schare, das Einhebel-Schaltgetriebe und sonstige Vorteile der Gummirad-Maschine.



Nebenstehende Abbildung zeigt die AMAZONE Drillmaschine, Normalmodell D 3, mit Gummibereifung 4,00—36 und mit dem neuen Getriebe. Die Gummiräder sind sowohl für die Drillmaschine als auch für den AMAZONE Düngerstreuer austauschbar zu verwenden. Durch die beiden Stellhebel beim Getriebe können

72 verschiedene *Geschwindigkeiten*

die sich nicht wiederholen, eingestellt werden, **ohne seitliche Schaltung und ohne Wechselräder** (Patent angemeldet). Die Abdrehkurbel befindet sich fest am Getriebe. Alle AMAZONE Drillmaschinen haben Auto-Vorderwagensteuerung mit besonders leichter und schlagfreier Lenkung, ein Lenkrohr, das gleichzeitig als Anhängedeichsel verwandt werden kann, staubdichte Naben und Momententleerung des Saatkostens.



**AMAZONE Drillmaschinen
haben sich in der Praxis
bereits
1000fach bewährt**

D3 seed drill



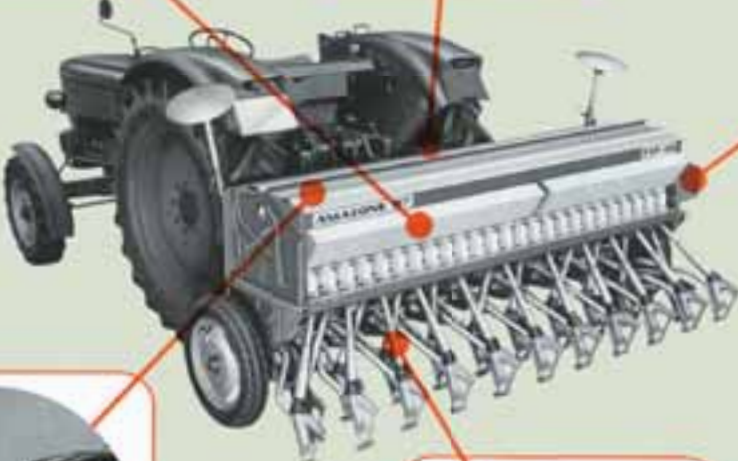


D4 seed drill

Meanwhile the two representatives of the Dreyer family's third generation had taken over the management of the company and had led it forwards through times of crisis. Prof. Heinz Dreyer had worked to develop a modern tractor seed drill and in 1964, these efforts resulted in the successful AMAZONE D4. Although it still had the proven "Elite seed wheel" and the practical Norton gearbox, the D4 featured spring pressure-loaded high quality coulters with anti-reversing flaps, an automatic track marker changeover, a large hopper with a folding lid, modern rubber tyres as standard and, in addition, it was equipped with a quick coupling frame. With this modern tractor seed drill, AMAZONE made the breakthrough and after a few years achieved sale figures of more than 5,000 machines per year and gained the market leadership in Germany for this sector.



D4 seed drill



Denkbar einfach ist das Abdrehen. Die neue Trichterschneide wird heruntergeklappt und die Saatmulde unter die Sädräder geschoben.


Das ist der elegante Schnellkuppelrahmen, außerdem sehen Sie die zentrale Federdruckverstellung.

Das ist das stufenlose Ölbadgetriebe, mit 1 Hebel stellen Sie einfach jede geforderte Sämenge ein.

Bequemer geht es nicht, der Faltdrehsack wird aufgeklappt, der Sack daraufgelegt und das Saatgut eingefüllt; Einfüllhöhe 1,13 m.

Ein stabiles und elegantes Schar mit der Stütze, die jegliches Stopfen verhindert, mit 4teiligem Saatleitungsrohr.

Kennen Sie den AMAZONE-Triomat, Drillmaschine, Rüttellegge und Saatriegel kombiniert? Fordern Sie hierüber Spezialprospekte an!





Successful machinery over 130 years of company history



D7 seed drill

For a long time the AMAZONE D4 was only offered in a 3 m version, then other working widths were produced from 2.5 m to 4 m and, with a coupling frame, even up to 8 m.

After various experiments and a painful recession in the entire agriculture industry, AMAZONE introduced in 1972 a new concept. The low design had a practical folding lid, on to which the full grain bags could be placed, a further improved coulter and most importantly, the acclaimed infinitely variable gearbox. These were the main features of the new AMAZONE D7. It was a great success. This machine was available in working widths of up to 4 m and in different specifications. Over the years the concept of the AMAZONE D7 tractor seed drill was subject to constant further development. Even the principle of the Elite seed wheel was optimised. The seed wheel was made bigger, the cams were improved and, in addition, the switching over from normal to fine seed was made easier. The successful D7 resulted in the D8 and then, finally, in the modern D9 which performs reliable sowing work all over the world.



1979 was an important year for AMAZONE seed drill technology – for the first time AMAZONE equipped its D7 seed drills with the so-called roll disc coulters, a development becoming increasingly important until today for mulch sowing.

D8-30 Special seed drill





b| D9 mounted conventional seed drill

So far, the latest stage in development of the conventional seed drill from AMAZONE is the modern D9 which has been in production since 1999. It has since been developed further and improved in many ways over the ensuing years.

The sowing system, the proven “Elite seed wheel”, was optimised and although the principle of the combination of normal and fine seed wheel has been maintained, over the years the cam wheel has been further developed to a cell wheel. In this way the application rate accuracy was improved for all kinds of seed, especially for dressed seed.



D9 3000 Super seed drill



D9-60, working width 6 m

Also all the other important elements of the seed drill, such as the gearbox, calibration device, loading board, and coulters, including the suspension of the sowing harrow, were further optimised. This resulted not only in an excellent distribution of the seed, but also a guaranteed long operational life. The D9 is, of course, superbly suited to the combined operation with all common soil tillage implements from the rotary harrow up to the rotary cultivator.

D9 3000 Super seed drill, combined with rotary cultivator and tooth packer roller



c | AD pack top conventional seed drill

In 1966 AMAZONE developed the first modern sowing combination in the world – the conventional D4 tractor seed drill combined with the PTO-driven RE reciprocating power harrow and, later on, with the appropriate packer roller. Such sowing combinations have become widespread and there is now no manufacturer of sowing technology in Europe who does not have a seed drill combination in its programme.

At that time, there was a need for a more powerful tractor when operating a sowing combination than with a solo seed drill.

Mr. Karl Thies, a farmer from Gaste, suggested mounting the seed drill directly on to a packer roller. This was an excellent idea because it gave several important benefits – the centre of gravity of the combination was brought forwards so the tractor required less lifting power; the packer roller is heavier resulting in a more intensive reconsolidation of the soil; and, finally, the wheels of the seed drill are no longer necessary so that the price is reduced. Right from the beginning the AMAZONE AD pack top seed drill was to become a success.

Although it is quite simple to separate the pack top seed drill from the packer roller if the soil tillage



AD 3000 Super seed drill

implement is going to be used for solo operation, this is not absolutely necessary as the coulters of the seed drill can also be raised. This maintains the load on the packer roller.

Over the years the principle of the seed drill on top of different packer rollers has become much more popular than linkage mounted systems.

AD 3000 Super seed drill on wedge ring roller in combination with rotary cultivator





d | Avant Front Tank pneumatic sowing combination

At AMAZONE a new era began in 1995 in the sowing technology sector, with the introduction of the pneumatic drills. The problem with conventional seed drills at larger working widths is the total transport width. Indeed, for a long time a transport device was offered for the classic seed drills enabling the transport to the field in a longitudinal direction. However, this was too cumbersome and too expensive for the customers. The pneumatic seed drills have a narrow centre hopper so enabling the coulters to be easily folded in for transport.

AMAZONE made further use of this possibility and developed the AMAZONE FPS pneumatic front packer seed tank. Initially the metering was carried out with a long row of classical cam wheels. The seed flow was pneumatically delivered to the so-called seed rail behind the tractor and there it was distributed via two baffle heads and routed via hoses to the individual coulters. The rail with its coulters was positioned behind a rotary cultivator with packer roller and the whole unit could be hydraulically folded down to a transport width of 3 m. The attachment of the seed tank in front of



Pneumatic front packer seed tank and 6 m rotary cultivator with tyre packer seed drill

the tractor resulted in a very favourable distribution of the total weight. On request, the drive to the blower fan and of the metering could be carried out via a small internal combustion engine if no front PTO shaft was available.

Avant pneumatic front tank sowing combination





Avant front tank pneumatic sowing combination

The next stage of development for pneumatic sowing technology at AMAZONE was the equipping the front tank with a centralised metering unit.

Also here, AMAZONE then developed something special, a metering system with different metering cassettes.

This enables fine seeds to be sown, such as, for example, rape in very small quantities without any effort. The front tank combination succeeded very well internationally and is still included unchanged in the production programme in 2013.



The metering cassettes in the metering unit can be easily exchanged. In this way it is possible to precisely meter all seeds and seed rates with a good longitudinal distribution even at high operational speeds.



Avant front tank pneumatic sowing combination



e| AD-P pack top pneumatic seed drill

With the development of the so-called front tank seed drill also the production of the Airstar Progress and Airstar Profi pack top pneumatic seed drills started. At that time the system was demanded by the market and with its large, centralised hopper it featured an important advantage. This hopper contains much more seed than the elongated hopper of the conventional seed drill and enables quicker and easier filling via big bags or even tractor front end loaders.

As with the AD combination, the large hopper is mounted on top of the packer roller and provides the necessary pressure for the reconsolidation of the seedbed. With the pneumatic seed drill, the distribution system is positioned in front of the seed hopper and so the centre of gravity is favourably shifted further forward and the hopper itself can be filled more easily and more comfortably. Also the



Airstar Progress pneumatic pack top seed drill



Airstar Progress pneumatic pack top seed drill



Airstar Profi pneumatic pack top seed drill



The RoTeC Control coulters for after the plough and mulch sowing are equipped with the Control 25 depth guidance roller enabling a tool-less and precise setting of the sowing depth.

Silver medal at
AGRITECHNICA 1999
for the RoTeC disc
coulters for seed drills.



AMAZONE metering system offers something special: Various metering wheels are attached to the metering shaft and so all common seeds can be accurately sown without conversion of the system, even rape in very small quantities.

Today, the pack top pneumatic seed drill from AMAZONE is available in two different versions: The AD-P Special for the smaller and medium sized farm and the AD-P Super for large farms and agricultural contractors.



AD-P Super pneumatic pack top seed drill

AD-P Special pneumatic pack top seed drill





f| NT/DMC Primera large area sowing technology (direct seed drills)

In Canada, in 1975 Prof. h.c. (SAA Samara) Dr. Dr. h.c. Heinz Dreyer started the development of seed drills which were also suited to direct sowing.

There are large areas, the so-called prairie areas, which have only a short vegetation period due to long winters and reduced rainfall in summer. Here there was a demand for direct sowing into the stubble. The stubble is left in the field for an especially long period so that it holds in winter as much snow as possible as protection against winter kill and for the conservation of the valuable, scarce moisture.

After several experiments Prof. h.c. (SAA Samara) Dr. Dr. h.c. Heinz Dreyer developed the so-called chisel opener which also could penetrate dry, hard soils. The sowing depth was regulated via a pressure roller, attached to the side which simultaneously covered and pressed the seed furrow. Mineral fertiliser, which is also necessary in extremely dry conditions, can be applied together with the seed. In the beginning the name of this seed drill was NT (**No Till**), later becoming the DMC Primera Today, this large area seed drill is not only suitable for direct sowing, but also for mulch sowing (previously cultivated stubbles) and for conventional sowing after the plough. Forward speeds of up to 18 km/h are



NT large area seed drill (approx. 1980)

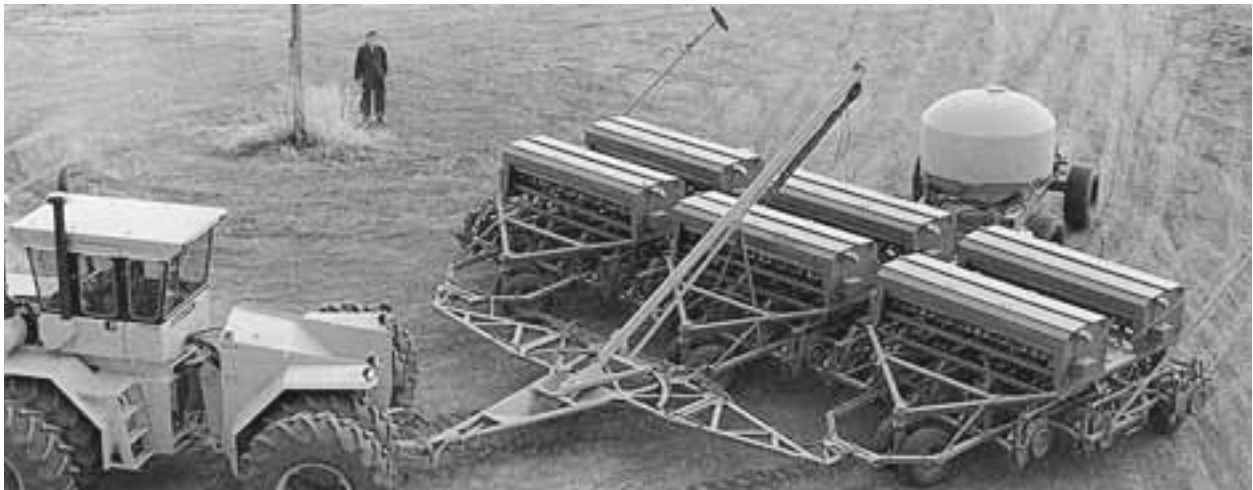
possible. AMAZONE managed to achieve the successful breakthrough only after the political changes in the former eastern block countries, where similar conditions to the Canadian prairie areas prevail. Meanwhile the DMC Primera is available in working widths of 3 m up to 12 m and even the 12 m version can be operated with tractors of just 300 HP as often available in Russia. Comparison tests of the different systems in the market at different sites showed that the AMAZONE DMC Primera provides the best performance. Thanks to its superb operation, the uni-

DMC Primera large area seed drill



DMC Primera





NT large area seed drill (approx. 1980)

versal machine with its pneumatic distribution system contributes to the very good image of AMAZONE technology.

For his great dedication Prof. h.c. (SAA Samara) Dr. Dr. h.c. Heinz Dreyer was elected, on the 16th February 2012, a Foreign Member of the Russian Academy of Agricultural Sciences RAAS/RASHN, and then awarded the Goryachkin medal of the University of Agricultural Technology in Moscow.



Chisel opener (2012)

The parallelogram-guided chisel openers enable the constant following of ground undulations. The stone safety system is an elastic vertical and horizontal damping for the negotiation of obstacles. The hoop rollers, as found on the Reflex discs, always ensure an excellent depth control and seed coverage.

DMC Primera large area seed drill with Exact harrow (2012)



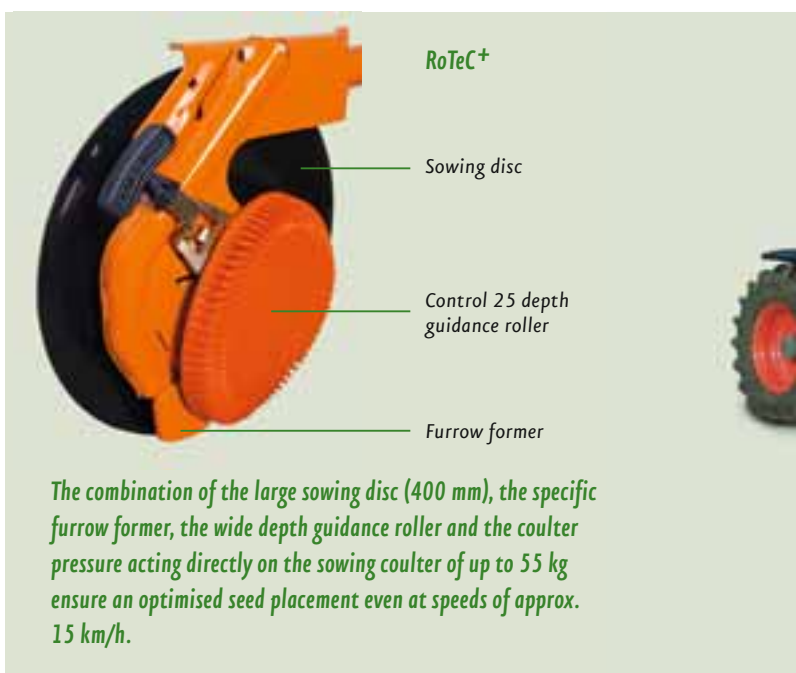
Optionally also with the Roller harrow



g | Cirrus large area sowing combination

With the opening up of Eastern Europe, the GDR and the former CIS states, AMAZONEN-WERKE had to cope with the demands from large farms for high-output sowing combinations and passive soil tillage implements.

In response, soon after the political change, the development of the AMAZONE Cirrus started in the Hude factory. In 2001, the Cirrus series followed in working widths of 3 m to 6 m, the first trailed, pneumatic large area sowing combination with an integrated passive cultivator. As the cultivation component, the Catros compact disc harrow was used as a means of passive soil tillage due to the fact that the Catros had already proved itself superbly as a solo implement. An enlarged coulter for the Cirrus was designed on the basis of the proven RoTeC coulters – the so-called RoTeC⁺ coulter.



Cirrus (2001) in transport position





Cirrus Super with PacTeC coulters and integrated chassis

Initially the Cirrus was equipped with separate running gear. After a re-design of the entire concept with an integrated transport wheel system, the system resulted in a machine of great success. Experience showed that, under lighter and medium to heavy soil conditions, the usual RoTeC coulters were completely sufficient, resulting then in the lean version of the Cirrus. This was not only noticeably

lighter but also cheaper. The Cirrus large area seed drills which are available today in working widths of 3 m to 6 m are meanwhile operated all over the world, even as far down as New Zealand. The efficiency brought about by the big hopper is enormous and outputs of 100 ha per day quite common. Meanwhile, the AMAZONE Cirrus became a “key product” in the comprehensive product programme.

Cirrus (2012) with integrated chassis





h | Citan large area seed drill

On large farms, with arable areas of several thousand hectares, even higher outputs are required. This also applies when sowing grain and rape. Here, the so-called “solo system” has prevailed in which the soil tillage is separated from the sowing operation. In this case soil tillage is carried out with the most powerful tractors and larger working widths. For sowing then a trailed seed drill is used. In 2005, AMAZONEN-WERKE started with the production of a large area solo seed drill, resulting in the AMAZONE Citan, a seed drill with a huge hopper, hydraulically folding seed rails on both sides and in working widths of up to 15 m. The Citan was equipped with the large diameter roll disc coulters (RoTeC⁺) and forward speeds of 12 km/h and more are possible. Under medium and lighter soil conditions, the seed drill can be equipped with the so-called Roller harrow which carefully covers the seed furrow with soil and then directly presses over the seed slightly. This new development was a success right from the beginning. With the Citan-C version, fertiliser can be applied simultaneously. The AMAZONE Citan seed drill became an important member of the seed drill family, enjoying constantly increasing popularity.



Seed placement is via the 400 mm diameter RoTeC⁺ Control coulters with a pressure of up to 55 kg acting directly on the coulters. Perfect levelling and coverage via the Exact or Roller harrow.

Citan 12001-C





Citan 6000 in the transport position

Seed and fertiliser hopper





i | Cayena tine seeder

The Cayena tine seeder is designed for rapid sowing with or without prior soil tillage. Its strength shows through, especially on hard and stony soils, and in dry regions where normal coulters fail. No matter whether for coarse, medium or fine seeds, for mulch sowing, for sowing in ploughed ground or into stubble the 6 m working width Cayena excels with its enormous work rates.

Thanks to its lower linkage mounting, the integrated running gear and the hydraulically folding tine carriers, the Cayena speaks for itself as a compact and, at the same time, a very manoeuvrable unit.

The 3,600 litre seed tank of the Cayena is both large and compact, allowing for an unobstructed view of the TineTeC coulters during operation. The large opening of the tank enables simple and quick filling. For simultaneous fertiliser application, the Cayena-C with its 4,000 litre pressurised tank can apply fertiliser alongside the seed.



The proven electric full metering allows the precise setting of the seed rate. Just the seed rate has to be entered into the operator terminal, the machine then calibrated and the determined weight entered in the terminal.



The TineTeC coulter forms a clean seed furrow free of organic matter. Due to the extremely narrow design little soil is moved. Advantages: Water is saved and the tractive capacity of the machine is minimised.

Cayena 6001





Cayena 6001

Cayena 6001-C with divided seed and fertiliser hopper





j | Condor large area direct seed drill for prairie areas

For these so-called prairie areas, or field conditions with little yield, AMAZONE has offered since 2010 a special seed drill for the direct and shallow mulch sowing with the simultaneous application of fertiliser. In this case the AMAZONE designers came up with a special idea. The Condor is equipped with ConTeC tine coulters which, as usual at AMAZONE, operate “on-grip”. Every coulters is provided with a means of depth guidance, i. e. a rubber pressure roller safely guiding the coulters at an adjustable depth of 2 cm to 10 cm. The distribution of the seed is carried out via the proven AMAZONE pneumatic metering system which allows the sowing of all common seeds from rape to beans in quantities of 2 kg/ha to 400 kg/ha without conversion. The AMAZONE Condor is available in working widths of 12 m and 15 m. Both machines are hydraulic folding down to a 3 m transport width. The machine is equipped with a constant seed flow monitoring. In recent years the Condor has proven to be the best and enjoys a constantly increasing popularity.

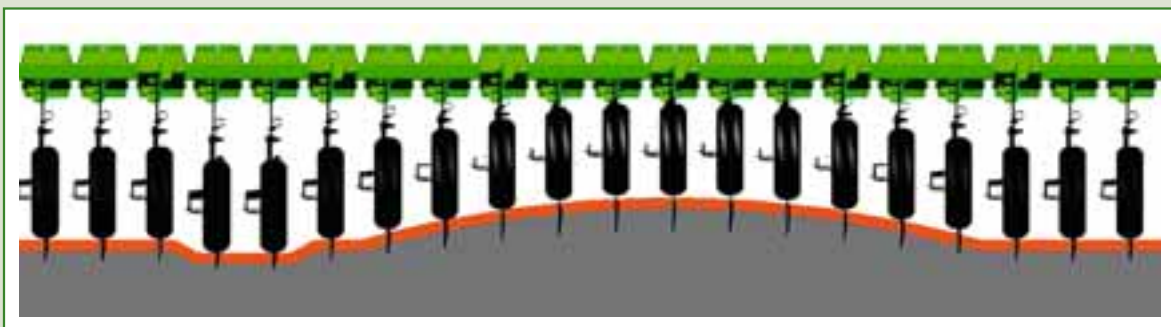


The coulters tips are provided with a hard metal plate made from a tungsten carbide/cobalt alloy ensuring an enormously prolonged operational life of the soil engaging parts even under the most arduous of conditions.

Condor 12001 with its 8,000 l pressurised tank (2/3 seed + 1/3 fertiliser)



“ConTeC” coulter system: Due to its simple and ingenious design without the usual hydraulic rams on every coulter, the ConTeC coulter ensures the perfect following of the ground contours. The flexible linkage between the frame elements and the coulter is achieved via the proven rubber sprung mountings. In this way ground undulations (at maintained sowing depth) of up to 65 cm can be compensated for. The coulter spacing of 25 cm in a three row design and a frame height of 80 cm ensure a blockage-free operation even where much straw or an unfavourable straw distribution prevails.



Condor 15001 in 15 m working width and a 3 m transport width





Chapter 7: Manure spreader

In 1950 Dipl. Eng. Heinrich Dreyer started the development of manure spreaders, at a time when only a few manufacturers in Germany were involved in the manufacture. The basis of the development was a heavy agricultural single axle trailer with a rack-and-pinion drive and also with a hydraulic tipping system. The vehicle was equipped with a smooth metal sheet floor and, if required, a spreader unit on a frame, provided with transport rollers, was attached to the vehicle. This enabled one man alone to mount and dismount the spreading device. For spreading manure, the platform of the vehicle could be tilted by approximately 30 %, making transport easier and saving drive power. At the front end of



K17 manure spreader

the vehicle bed, a push board was installed which delivered manure continuously to the spreading drum at the rear. The name of the vehicle was AMAZONE UK (Universal Kipper [dumper]). These machines achieved considerable efficiency and one of the models that stands out in this sector was the AMAZONE UK1, a small dumper with large rubber tyres which required lower horsepower and could

UK manure spreader



AMAZONEN-WERKE



AMAZONE



STALLDUNGSTREUER



AM 3173, S. 40

K17 manure spreader



even be operated with 11 HP tractors, which were still very popular during the 1950s in Germany.

The wheels and frame of the UK1 were universally usable and with additional components allowed the conversion on a crop protection sprayer, a large mineral fertiliser spreader or a haulm chopper for fields of potatoes.

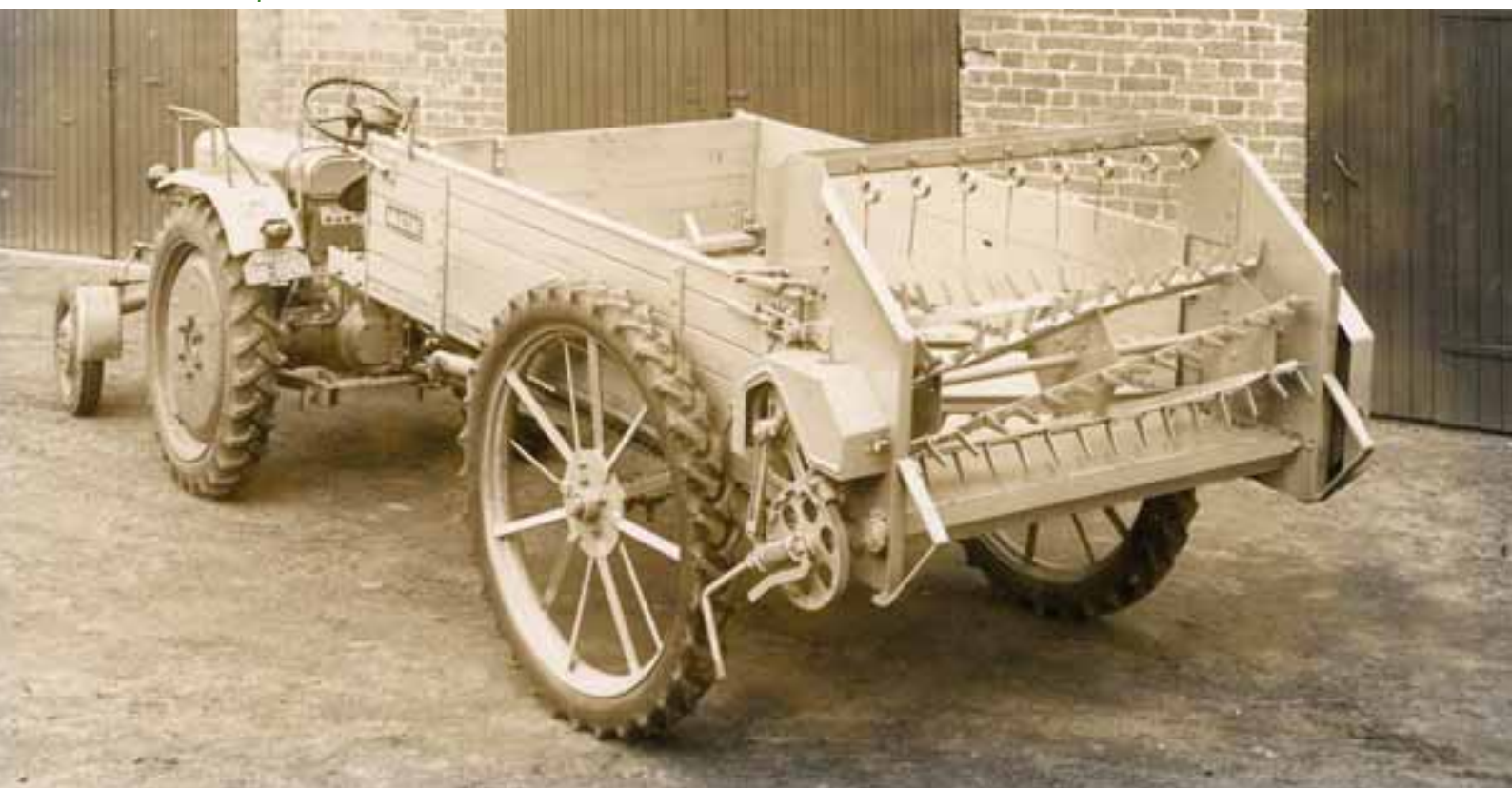
The next generation of the AMAZONE manure spreader was a light transport vehicle with a scraper floor and a large worm auger drum. The machines of this generation were called SK15 and SK17 and were able to spread the manure a bit wider than the vehicle resulting in a very practical solution for driving the next bout.

The last generation of the AMAZONE manure spreaders were very robust vehicles with thick tube as a chassis. The practical worm auger spreading drum was maintained and these spreaders operated very reliably and are partly still in use today. In the course of the 1970s, the market for manure spreaders was rather saturated as several other competitors came into play and so it was decided to focus on the core competencies and the production of manure spreaders was terminated.



SK15 manure spreader



UK1 manure spreader



M 558
4. 55

"Streu-Knecht" auf **AMAZONE** Kipper

*der Stallung-Streuer
ohne Rollboden
für Streugut aller Art*



- - *Das ist gleichmäßige Streuarbeit!* - -

UK manure spreader



Chapter 8:

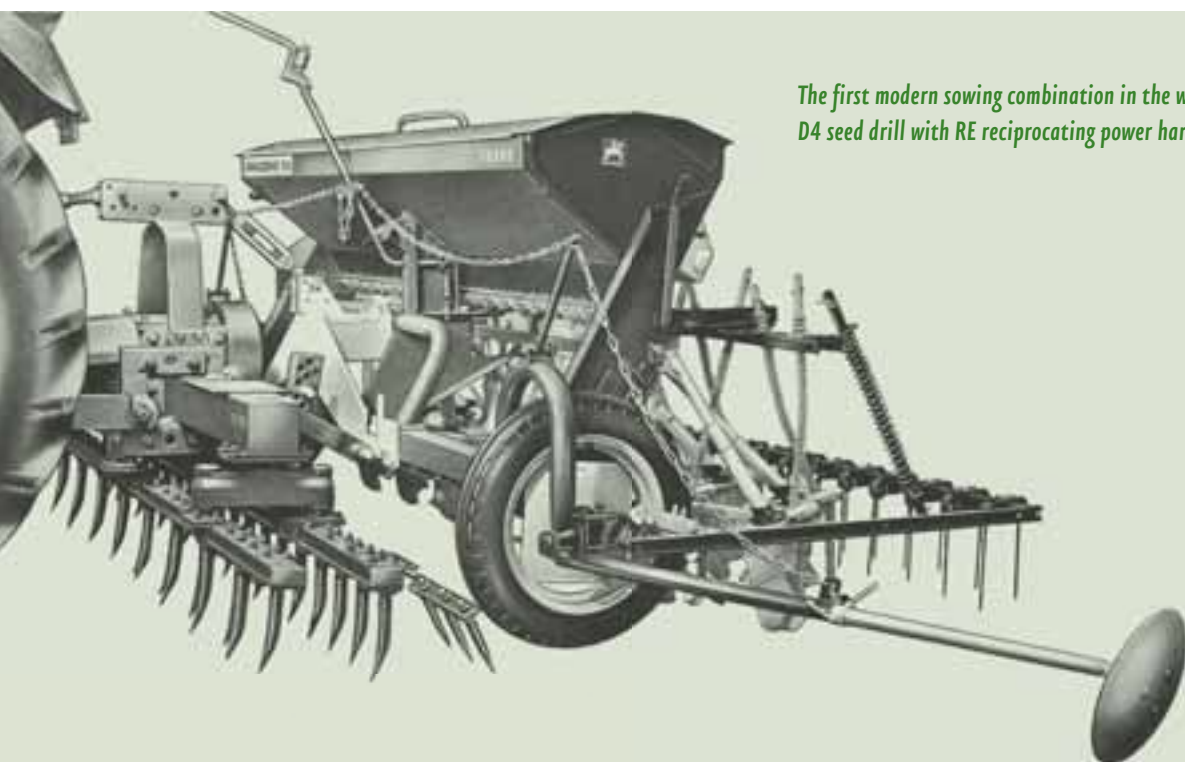
Active soil tillage

a | RE reciprocating power harrow

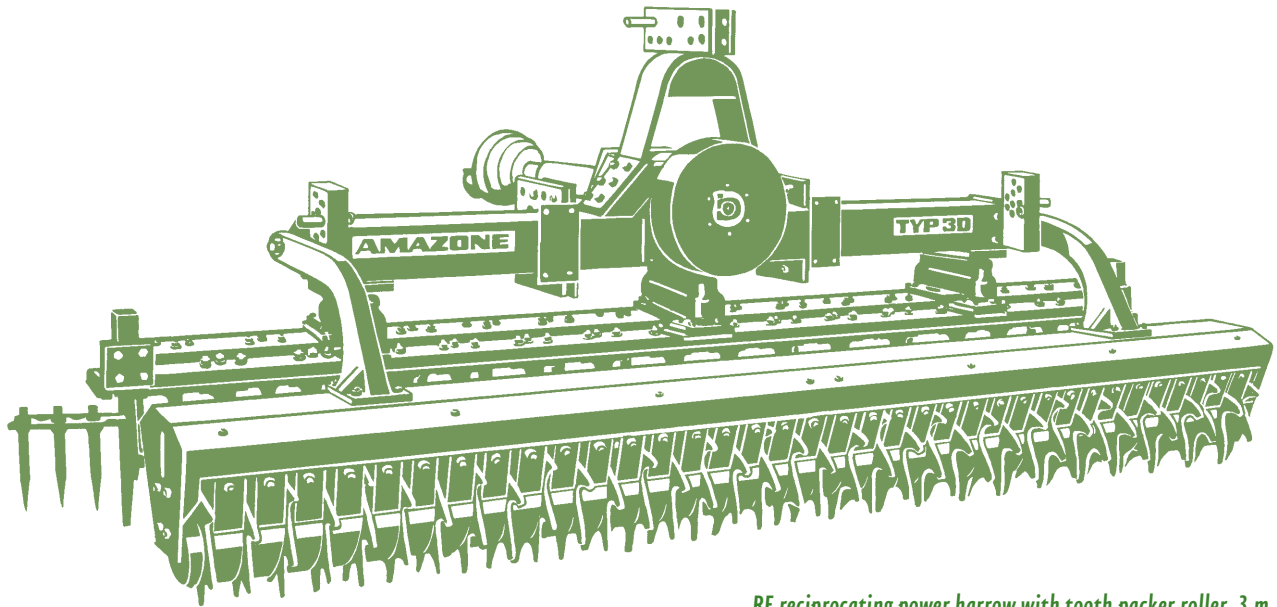
One of the most important inventions from AMAZONE – apart from the simple worm auger fertiliser spreader and the modern twin-disc fertiliser spreader – is the sowing combination: a seed drill combined with a reciprocating power harrow. The former works manager of AMAZONEN-WERKE in Hude, Dr. Eng. Franz Große-Scharmann, had noticed that during sowing the tractor was never fully utilised. It often travelled too fast and this resulted in a poor seed placement in the soil. He surmised that if the sowing operation could be combined with the seedbed preparation, the sow-

ing performance could be improved, much time and fuel would be saved, and the annoying tractor tracks could be avoided.

For this he took the little known principle of the reciprocating power harrow, and designed an implement which was extremely compact. In 1966 the RE reciprocating power harrow, combined with the AMAZONE D4 cam wheel seed drill, resulted in the world's first modern sowing combination. The performance of this combination was impressive. However, it soon became evident that although the reciprocating power harrow created a very fine seed-



*The first modern sowing combination in the world!
D4 seed drill with RE reciprocating power harrow*



RE reciprocating power harrow with tooth packer roller, 3 m

bed it was, however, too loose and the seed was placed too deeply into the soil.

Reconsolidation was needed and, after some experiments, Dr. Scharmann created it by attaching a roller which later became a tooth packer roller which was then the first tooth packer roller in the world. In this way, the combination of the reciprocating harrow and seed drill with the tooth packer roller performed, in one pass, simultaneous seed-bed preparation, reconsolidation, sowing and harrowing. Today the use of the sowing combination has become a matter of course everywhere and for

all manufacturers. This sowing combination was an earth-shattering innovation from AMAZONE. The AMAZONE reciprocating power harrow featured two tine bars which oscillated, via a universal joint shaft and a wobble drive at 750 times per minute and this resulted in an intensive soil tilling and even clods were smashed on the soil surface. Harrow tines were fitted to the tine bars which were bent forwards and thus were positioned “on grip”. They pulled themselves into the soil, slightly raised the soil and thus improved the work of the harrow by always maintaining its working depth.

D8-30 Special





b | KG rotary cultivator

Over time ploughing was increasingly given up and mulching with the cultivator became more common. The reciprocating power harrow for seedbed preparation was no longer suited to the sowing combination as it tended to rake up the crop residues. An alternative had to be found! Many farms used a so-called rotary harrow for this purpose which, however, had the disadvantage that, especially on heavy soils, it only worked on the surface and was not able to maintain its desired working depth.

In 1978 AMAZONEN-WERKE again had developed a sensational machine, the AMAZONE KG rotary cultivator. This machine operated with the “on-grip” tines as already seen in the AMAZONE reciprocating power harrow. The cultivator tines automatically pull themselves into the soil, mixing the stubble and other plants, pulling up maize roots and mixing them with the soil so that the rotting of the crop residues is optimised.

The rotary cultivator went through a difficult development stage and initially posed some problems. In addition, the ideal solution with swivel gearboxes on every rotary tool was unaffordable.

In 1987 the perfect solution was found: the spring suspension of the “on-grip” tines. When hitting obstacles these tines give way by up to 7 cm to the rear in a socket. Consequently the shock does not affect the machine or the gearbox.



Cross-section of the rotary cultivator

In very stony conditions, the rotary cultivator can lift automatically without affecting the remaining sowing combination. With the KG rotary cultivator, AMAZONE achieved this breakthrough and dominated the market – today after 25 years of success there

The extreme stone test track in the Hude factory



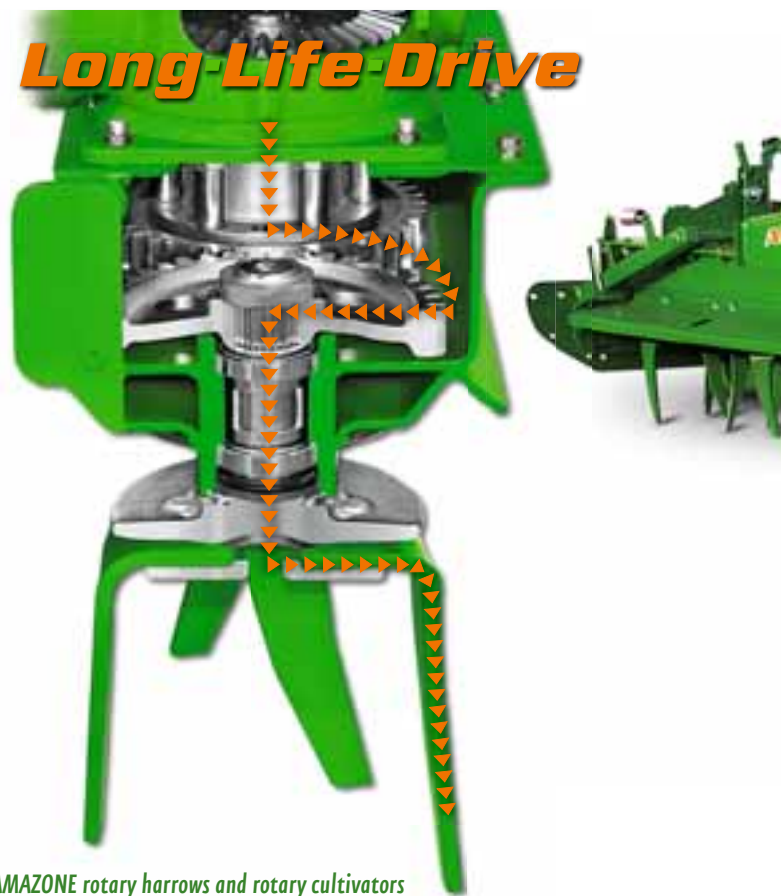


RP-AD pack top tyre packer seed drill in combination with KG rotary cultivator



are many other manufacturers who have taken over this principle. The AMAZONE rotary cultivator is available in working widths of 2.5 m to 6 m. The models from 4 m and wider are also available as hydraulically folding.

Long-Life-Drive



AMAZONE rotary harrows and rotary cultivators with their Long-Life-Drive system are characterised by their long operational life and maximised smooth running.



KG 3000 Super



KG 6000-2 folding rotary cultivator





c| KE rotary harrow

More than 25 years ago AMAZONE had developed the rotary cultivator with its “on-grip” tines which remains very successful today.

However, soil conditions exist where “trailing” tines are desired. For these conditions, AMAZONE has designed the rotary harrow with new benefits – a strong trough and large clearance for soil and crop residues.

The AMAZONE KE is designed on the principle of the rotary cultivator but with a strong, very torsion resistant trough and a very large clearance in between the tine rotors and the trough. With this development AMAZONE hopes to continue to gain greater recognition in the market. The rotary harrow is another success story for AMAZONEN-WERKE.



KE 140 rotary harrow



d | KX rotary cultivator

It became obvious in agricultural practice that the rotary harrow has some advantages on lighter soils. For example, the tines with their slightly trailing position do not transport stones and clods to the surface. In heavy soils, however, the rotary cultivator is suited better as it constantly maintains the working depth and achieves a more intensive mixing of soil and crop residues. This is of great importance for the rotting down of straw and maize stubble residues.

To combine these specific advantages of both machines, AMAZONE developed the KX, a machine which enables both tines to be utilised in changeable operation and soil conditions.

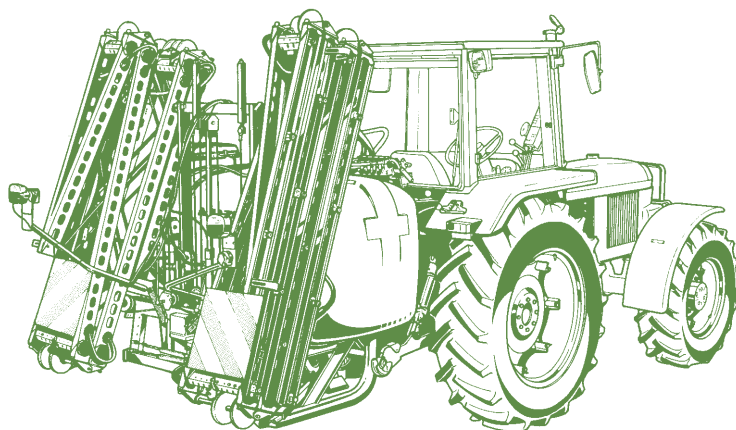
The quick tine change system means the conversion is very simple, quick and, above all, without tools, e.g. in autumn the rotary cultivator “on-grip” tines can be used, and in the spring, the rotary harrow “trailing” tines for seedbed preparation are more beneficial.



KX rotary cultivator



Chapter 9: Crop protection sprayers



a | US crop protection sprayer

In 1969 AMAZONE entered the sector of crop protection sprayers. The reason was the increased usage of liquid fertiliser in agriculture. AMAZONE dominated the market of mineral fertiliser spreaders and did not want to miss the boat in a changing fertiliser market.

The entry to the sprayer market was technically rather modest. The sprayer programme included mounted implements of 300 l to 600 l with boom widths of 8 m and 10 m. At least the tanks, which were made from fibre glass reinforced polyester

were produced in the main factory in Gaste. The boom was manually folded, however, the pump was – and is still today – a sophisticated piston diaphragm pump. From the start the AMAZONE US sprayer models were liquid fertiliser proof.

Five years later the situation was quite different. The mounted sprayer programme already had tank capacities of up to 1,000 l and the booms,

US 1000 in operation





US 600 in operation

with widths of up to 18 m, were hydraulically folded and very robust. The nozzle carriers were injection-moulded in the in-house plastics department.





b| UF crop protection sprayer

With the development of the UF mounted sprayer, the AMAZONE sprayer became more stylish and began to play an important role in the market. In 1986 AMAZONE introduced a sophisticated boom in aircraft style design: “Simultaneously superbly light, superbly robust and superbly narrow” and up to working widths of 21 m with a transport width of only 2.4 m. Intelligent, lightweight construction also meant that each material is used where it makes sense. For example, aluminium for weight reduction is used at the boom end, however, not in the boom’s inner section. There, high-strength steel is required preventing the boom from getting flexible and weak.

The special feature of the AMAZONE boom was the unique lifting and folding technology. Initially the so-called H-booms were folded out and in via 2 V4A ropes. Today’s Super S boom is fully hydraulic folding via rams on every pivot point. The electro-hydraulic Profi-fold even enables one-side boom folding or angling.

Today the capacity is 900 l to 1,800 l and the booms are available in working widths of 12 m to 28 m. With these sprayers AMAZONE conquered the market leadership in Germany in this sector. The AMAZONE boom impressed farmers so much that they sometimes only bought the boom and mounted it on to their existing sprayer tank.



The AMAZONE sprayer boom – robust and virtually movement-free

UF 1801 with Super-S boom



UF 1201 with Super-S boom



c | FT front tank

The intelligent combination of the UF mounted sprayer and the FT front tank system with a capacity of 1,000 l has turned the tractor into a little self-propelled sprayer. Depending on the size of the mounted sprayer, the front tank enables an increase in volume up to 2,800 l. Thanks to the bigger tank volume, the front tank system achieves acreage outputs like that of a trailed sprayer or a self-propelled of the same filling capacity. The front tank is an especially interesting option for vegetable and arable farms; however, it is also used by agricultural contractors operating in areas with smaller fields.

The intelligent front tank solution with the Flow-Control system has been included in the AMAZONE programme since 1991 and enjoys very great popularity. Initially made from stainless steel, now the shapely front tank is made from a very durable plastic.

In 2008, the top agrar professional journal has subjected the combination of UF mounted sprayer and FT front tank to a system comparison with a UX trailed sprayer. The editors came to the conclusion that the front tank solution does not only offer a price benefit over the trailed machine but also that the “small self-propelled” sprayer can be more easily manoeuvred and features problem-free driving behaviour on the road.



FT 802 front tank made from stainless steel

Operating the combination is no more complicated than that of a trailed sprayer. Due to the intelligent electronic control of the injector system, the same concentration of the spray agent is always maintained in both tanks and the driver can fully focus on the spraying operation.

No wonder that the combination of front tank and mounted sprayer enjoys great popularity and that it is a real success.

UF with FT 1001 front tank





d | UG trailed crop protection sprayer

Building on the success that AMAZONE had achieved, a bigger trailed sprayer was required. Also here something special was developed. The technical means of sophisticated sheet metal processing and the decades of experience in this sector turned out a chassis which only consisted of in-house made profiles that could cope with the rigorous demands. The booms

were utilised from the proven mounted sprayer. The implement was called the AMAZONE UG and right from the beginning it was enthusiastically accepted by customers.



UG 3000 Super with Super-S boom



AMAZONEN-WERKE

AMAZONE

Feldspritzen



25 Jahre
Pflanzenschutztechnik



AMAZONE

UG 2200



e| UX trailed crop protection sprayer

In 2004 an additional model of modern, trailed sprayers appeared at AMAZONE. This is the leading product – the AMAZONE UX, a shapely trailed sprayer which is available today with capacities of 3,600 l to 6,600 l and with working widths of 15 m to 40 m. The Super-L booms are equipped on every pivot with AMAZONE hydraulic rams that enables the folding out at the touch of a button from the tractor seat. The folded in booms are positioned down the sides of the tank. The boom is fixed safely, without movement, on the transport locking hooks

with any shock loads being absorbed via the parallelgram suspension even in the transport position.

The multiple-folded steel profiles of up to 220 mm make the Super-L boom superbly robust. The transport width of a UX 5200 with a 40 m boom is only 2.6 m. On request the UX can be equipped with axle steering. The electronic control ensures precise tracking behind the tractor. The UX and also all the other AMAZONE sprayers are designed to be especially operator-friendly.



UX 5200

UX 5200 with Super-L boom





UX 11200

To complete the trailed sprayer programme range, AMAZONEN-WERKE introduced in 2011 the large UX 11200 with an actual volume in total of 12,000 l. This flagship with tandem axle features a working width from 24 m to 40 m with a transport width of just 2.8 m. Of course, this modern crop protection implement is equipped with all the normal technical refinements, including GPS-Switch which enables the automated reduction of the spraying width on areas which have already been treated, for example on the headland, in field corners or when spraying in short work.

The new UX 11200 not only impresses with its attractive design but also by its outstanding technical possibilities and the easy handling.

In 2012, the first production series of the UX 11200 was launched and it was well received by all its buyers. Meanwhile, the UX 11200 is now a full member of the sprayer family and will help to further improve the image of crop protection technology from AMAZONE.

UX 11200





f| Self-propelled sprayers

Since 2000, a self-propelled sprayer has been included in the AMAZONE sprayer programme. Initially this was the AMAZONE SF. The vehicle was produced in The Netherlands by Messrs. Agrifac and featured superb characteristics, such as the possibility to adjust the wheel track on the move, individual wheel suspension and hydraulic drives on every wheel. It was the ideal implement for agricultural contractors. The spraying technology, from the tank and the booms right up to the control chest was, of course, manufactured by AMAZONEN-WERKE.

Since 2009, the self-propelled sprayer has been manufactured in-house at the AMAZONE subsidiary ATL in Leeden/Westphalia and is now called the AMAZONE Pantera.

The vehicle was entirely re-designed and significantly improved in many areas. AMAZONE even developed a specific electronic control for the engine with its 200 HP, maintaining the engine always at the optimum speed range to keep the fuel consumption low. Already many PANTERAs have been delivered to countries around the world, and they have been extremely successful.



Pantera's unique tandem chassis provides both superb adaptation to soil undulations and a high stability – of course, even on slopes. Thanks to the level-controlled, hydro-pneumatic suspension, the driver of the Pantera enjoys maximum comfort.

SF self-propelled sprayer



In 2008, AMAZONE has developed for all UG, UX and Pantera models a suction valve which is produced in-house. This technique ensures that the suction valve, which is easy to handle, is extremely insensitive to polluted water.

In the sprayer sector, AMAZONE have become a leading manufacturer. AMAZONE sprayers have an excellent reputation!



The Pantera driver's cab – with high-quality equipment, optimum all-round visibility and high operational comfort.



Pantera self-propelled sprayer





Chapter 10: Packer rollers

a | PW tooth packer roller

With the invention of the first modern sowing combination in the world, the seedbed preparation via the reciprocating power harrow made it necessary to reconsolidate the loosened soil as otherwise the seed would be sown too deeply. Initially tests with the following packers from multiple-purpose implements or seedbed combinations, which were commonly in use at those times, were carried out. But it soon became obvious that these could not withstand the strain for long and that the reconsolidation was not intense enough.



Reciprocating power harrow, tooth packer roller and D7 seed drill

Then AMAZONEN-WERKE started its own development which resulted in 1974 in the first tooth packer roller in the world. Today such a packer roller is offered by virtually all manufacturers of soil tillage implements and yet hardly anybody knows that the tooth packer roller is one of the many in-

D9 3000 Super with tooth packer roller





D9 3000 Super with tooth packer roller

ventions from AMAZONE. Many thousands of these rollers have been produced and it is still included in the production programme and is available in three versions: in diameters of 420 mm, 500 mm and 600 mm and in various working widths.

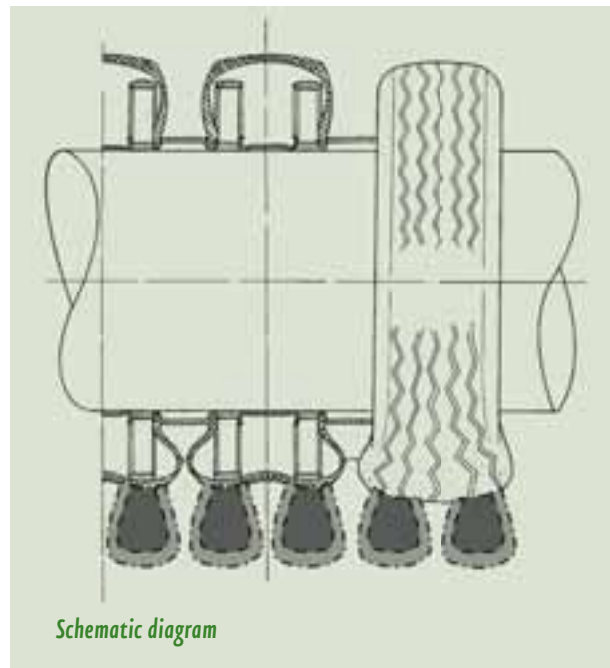


KE rotary harrow with tooth packer roller



b| RP tyre packer roller

Over time it became apparent that the use of AMAZONE sowing combinations on especially heavy soils caused the strain on the packer roller to be rather high. This was due to the scrapers having a big braking effect in sticky soils. For such cases the so-called tyre packer roller was developed in 1992, which was a rather complex construction. On a robust metal tube, polyurethane rings were mounted that were covered with a normal car tyre. The plastic rings pressed the soil in strips and the rubber tyres, due to their flexing, ensured that no soil stuck to the roller and thus did not to be removed by a scraper. There is sufficient space for the loose soil left between the tyres to be shallowly distributed above the sown seed via the following harrow.



RP-AD 302 with tyre packer roller



The coulters of the seed drill are arranged in such a way so that the seed is accurately sown into the compacted row left by the ring. In the gaps in between, the soil remains loose so that even heavy rain can drain away. The performance of the AMAZONE sowing combination with tyre packer roller leaves an ideal germination: A completely even field with very even and shallowly sown seed which always emerges within shortest time. The farmers were delighted.

Tyre packer roller





c| KW wedge ring roller

The better is the worst enemy of the good. This also applies in the case of the tyre packer roller. Although the performance of the tyre packer roller was excellent, several possibilities for optimisation were noted over the course of time. The tyres of the packer roller were very expensive and sensitive to sharp stones. At the same time the fitting was very complex. Also a certain weakness of the system was noticed in very heavy soil conditions as here, too little loose soil remained for covering the seed. So, in 1996, the so-called wedge ring roller was developed at AMAZONE where a highly resistant rubber ring is positioned for every seed furrow. The wedge ring roller forms the ideal furrow for the seed and in between the wedge rings enough loose soil remains for covering the seed. It seems that in this way the “non-plus ultra” has been discovered. The loose soil furrow is left between the rows in which, after a heavy rainfall, the water drains quickly away. This concept of the wedge ring roller has prevailed and is enthusiastically approved by farmers and experts. Meanwhile it has been recreated by many competitors; however the original still is the best.



AD 3000 sowing combination with wedge ring roller

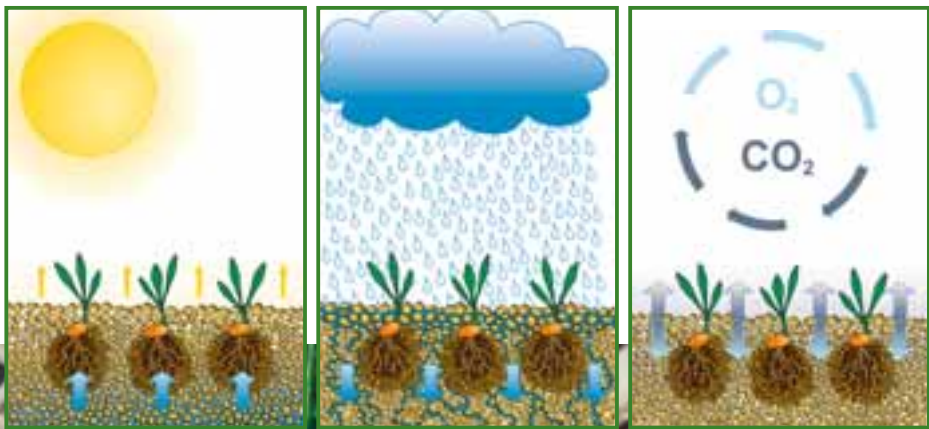


KE rotary harrow with wedge ring roller



Due to the demixing effect of the rotary cultivator, coarser clods are deposited on the surface. Fine soil remains in the sowing horizon creating superb germination conditions. The seed thus sits in the area of the fine soil. The coarser clods on the surface protect the seedbed from capping, drying out and erosion. The “Roller-Drill-System” with wedge ring roller, RoTeC Control coulters and Roller harrow provides an improved seed growth and increased yields.

KW wedge ring roller





d | SW cage roller

Special rollers are available apart from the tooth packer roller and the wedge ring roller. For sites with lighter soils and for smaller tractors the light-weight cage roller is available. Tandem rollers are

often used for seedbed preparation as the rear, smaller bar roller rotates quicker than the front cage one, the topsoil is broken up so that moist soil can dry off better.



Rotary harrow with cage roller



Centius with cage roller



Cenius with tandem roller

e| Knife ring roller

The knife ring roller consists of a roller drum and a knife rail with associated mounting parts. They are ideal for operation on heavy and clay soils where the knives provide an intensive clod cutting effect and a smooth travel. On the other hand, they are

also suited to very light soils where normally the soil would bulldoze in front of an enclosed cylinder resulting in its blocking.



Knife ring roller



Chapter 11: Municipal machinery

a | Groundkeeper mounted mower collector

In 1985, at the instigation of our business partner, Mr. Dezort from France, we developed a universal mowing machine for green area maintenance. An implement from the USA served as a model which in principle did a good job, however it also showed some shortcomings. We tested the implement on our own grass and realised there was an opportunity to improve the principle. Within a short period, the former head of our subsidiary in Forbach, Dipl. Eng Schomäker, found a solution which vastly improved the model. We called this new develop-

ment the “Groundkeeper”, which then quickly became a household name in the whole of Europe.

The special nature of this mower for small tractors is that not only short or very long grass can be mown and collected, but that it also, if required, simultaneously scarifies or collects leaves and does so even under wet conditions where conventional grass-cutting machinery would block.

The reason for this versatility is based in the chopping principle, which means, the Groundkeeper operates with a horizontal cutting rotor with “free-

Groundkeeper



*Mowing**Collecting leaves**Scarifying*

hanging” suspended knives. This suspension system allows the exchange of the mowing knives, and also the scarifying blades, with a single movement of the hand and without the need for tools.

AMAZONE started with a small 1.2 m wide machine. Now there is a comprehensive range with mounted and trailed machines available up to a working width of 2.1 m. Under the name of Horse-Hopper, the Groundkeeper also made many friends among horse owners because not only does it cut everything that grows on a paddock, but it also collects the horse droppings as well.

*Groundkeeper**Horse-Hopper for paddock maintenance*



b | Profihopper self-propelled mower collector

After the Groundkeeper mower collector had proved itself, requests from customers for a self-propelled Groundkeeper became increasingly louder. Indeed, on most farms a suitable tractor for mowing large meadows exists, however this mowing principle should also enable operation in parks and on golf courses among trees and bushes. For this purpose a tractor in combination with the Groundkeeper does not provide sufficient manoeuvrability. So in 1995, AMAZONE developed the Profihopper, a universal mower collector, which mows grass of any length, and under any weather conditions, and also offers scarifying and leaf collection. In addition the Profihopper also collects dry branches, acorns, cones and other rubbish lying around in parks.

With all these useful features it is not surprising that Baron Constantin von Heeremann, Dr. Bernard Krone and the Prince of Wittgenstein use such a piece of kit in their gardens. And the owners are continuously amazed by the big capacity of the hopper that looks relatively small. The reason is that a robust worm auger takes the finely chopped up



Immediately after collection, the cuttings are delivered by the worm auger conveying system, then transferred and compacted in the collecting hopper. By the compaction of the mown material, the actual volume of the hopper is increased from 730 l up to 1,000 l.

Profihopper iDrive





Collecting rubbish



Mowing



Profihopper zDrive with Zero-Turn

cuttings and then presses them into the hopper which can be then hydraulically discharged into a trailer or a container. These finely chopped cuttings can then be composted without any problem. In addition, sports fields can be maintained with the Profihopper.

Profihopper 4WDi with intelligent all-wheel drive

Silver medal awarded at the Demopark 2011 for the Profihopper 4WDi.





c| Landscape maintenance combinations

AMAZONE landscape maintenance combinations solve most problems when establishing new lawns or when used for the regeneration of green spaces.

The AMAZONE landscape combinations with stone burier incorporate stones and crop residues along with the soil. In one operational pass the most important preconditions are created for a favourable plant development – a well prepared, even seedbed; the even placement of the seed at the desired depth and over the entire working width plus having the required contact of the seed with the soil moisture.

In this way, a quick and even growth of the seed is ensured.

AMAZONE landscape combinations are the ideal solution, not only for establishing new lawns but

also to maintain and to improve green spaces and leisure grounds in a good condition and for a prolonged period.

Lawn thatch endangers the natural growth of the lawn. It loses its resistance against diseases and the water and nutrient supply becomes more difficult. Scarifying at regular intervals provides a healthy soil structure.

With the use of reseeding combinations a noticeable improvement in growth of the lawn is visible within a few weeks. Often, a costly reseeding is not necessary.

GNK 20 reciprocating grass reseeding combination





Grass reseeding with reciprocating power harrow



Grass reseeding with rotary harrow



Grass reseeding with stone burier





Chapter 12: Control and monitoring technology for AMAZONE machinery

Today, in modern agriculture, there is not much left of the classic farming technology which was common 130 years ago at the time when AMAZONEN-WERKE was established. (Also the conscientiousness of those involved has totally changed in the course of those years.) In hardly any other sector of society has the change in structure been so radical than that in modern agriculture. 50 years ago one human being fed 6 human beings. Today one human being feeds 120.

AMAZONE has played a major role in this development. The machinery is not only more efficient, but in many cases they are controlled by sophisticated electronic systems optimising the use of seed, fertiliser, crop protection agents and fuel. This effi-

ciency means more environmentally-friendly machinery. The system also enables the complete documentation of all operations in the field. Our own development of electronics started in 1985 when,



UX sprayer

ZA-M spreader

AD-P Super seed drill

with the aid of the AMATRON on-board computer, the functions of the implements were monitored and the application rates of fertiliser spreaders, seed drills and sprayers were regulated relative to the forward speed. This development was possible due to the advancement of electronic components and computer memory capacities becoming smaller, more efficient and cheaper. At AMAZONE, this development started very early and over the years it has become a significant force.

Today, AMAZONE offers a wide variety of operator terminals in different levels of sophistication. The on-board computers took over from the control and regulating switch boxes, yet looked more elegant and also feature ergonomic benefits with AMAZONE putting a significant focus on the fact that the on-board computers allow operation with just one hand. This is important as man only has two of them!

The application rate is electronically controlled according to needs. This is of special importance on the headland and when working near water courses. Special N-sensors mounted at or on the tractor monitor Nitrogen (N) uptake.

The latest advancement in the electronics is the utilisation of GPS (Global Positioning System), which can be used to keep the tractor safely in the track (GPS-Track) and also to automatically switch off the machine, partially or totally, in areas which have been already worked (GPS-Switch).



Award for 30,000 AMATRON on-board computers from 2003 – 2012.

The great importance of electronic control system at AMAZONE is reflected by the fact that, in the years 2003 to 2012 alone, more than 30,000 AMATRON on-board computers have been delivered.





Chapter 13: Precision single seeders

a | ED pneumatic precision single seeder

Years ago, a request was addressed to AMAZONEN-WERKE to supplement its sowing technology programme with precision single seeders. Worldwide the demand was very high but the availability in the market was relatively low. In 1987, AMAZONE produced the ED precision single seeder. This solution was a technological advancement as, although the principle of pneumatic singling was well known, it was, however, considerably improved by AMAZONE.

In-house plastic processing enabled AMAZONE to make new advances. The housing of the singling units and the large singling discs were made from



ED 602-K

fibre glass reinforced polyester. The aim was to drop the seed grains as close to the ground as possible, resulting in an improved accuracy and enabling a higher forward speed. This precision single seeder was named AMAZONE ED, (“Einfach Durchdacht” meaning ‘cleverly engineered’).

ED 300-4



In the beginning, there were a few technical problems which impeded the ED's initial success. However, it quickly became apparent that the principle worked well. A higher forward speed of 10km/hr was attained compared with other machines where 8 km/hr was previously the optimum. Slowly but surely AMAZONE forged ahead and managed to remedy the early problems. Initially working widths of 4 and 6 rows were offered. Later this was extended up to 12 rows, which included a very sophisticated hydraulic folding frame which folded the 12 row implement within seconds down to a transport width of just 3 m. AMAZONE has achieved great success in this sector around the world with agricultural contractors turning to AMAZONE in big numbers.



The Classic sowing unit is suitable for sowing maize, sunflowers, beans, peas and cotton in ploughed ground even at high forward speeds.



The Contour sowing unit is usable both for sowing following the plough or when mulch sowing. Here: in sugar beet specification with intermediate press roller.



ED 602-K: narrow sowing with 12 rows and front tank





b| EDX high output precision single seeder

The most hectic time in agriculture is the spring season when, after winter, the soil is warm enough for planting maize.

Overnight all farms want to get the seed into the soil to make the best use of the prevailing moisture. For agricultural contractors this is a difficult and very busy period, requiring efficient machinery.

To address this AMAZONEN-WERKE produced the AMAZONE EDX high output precision single seeder. This machine is built on the known principle of a separate pneumatic conveyance system and a centralised singling and included more specific details. Today an 8-row machine is equipped with only one centralised hopper and one singling system. This consists of a metal sheet drum with 8 rows of metering holes. Inside a very strong blower fan provides the vacuum so that the seed grains are drawn to the holes. These then are stripped off precisely, sucked into the seed tube and transported to the coulter at a high speed. There the seed grain is collected by a soft plastic catcher roller and pressed into the soil. Then it is covered with soil and the soil is loosely levelled. With this principle AMAZONE achieves an operational speed of up to 15 km/h, twice as fast as anything previ-



On the EDX, the adjustment of the stripper fingers is carried out on all rows simultaneously. As a special option, remote control of the stripper is available enabling the driver to regulate the stripper finger position from the cab during operation.

ously seen. With the aid of the centralised hopper the refill time is also reduced. The agricultural contractors were delighted, and they still are, with the enormous efficiency when planting maize, of which they could not have imagined in their wildest dreams. For AMAZONE this is yet further ad-



Gold medal awarded for Xpress grain singling and placement system at AGRITECHNICA 2007.





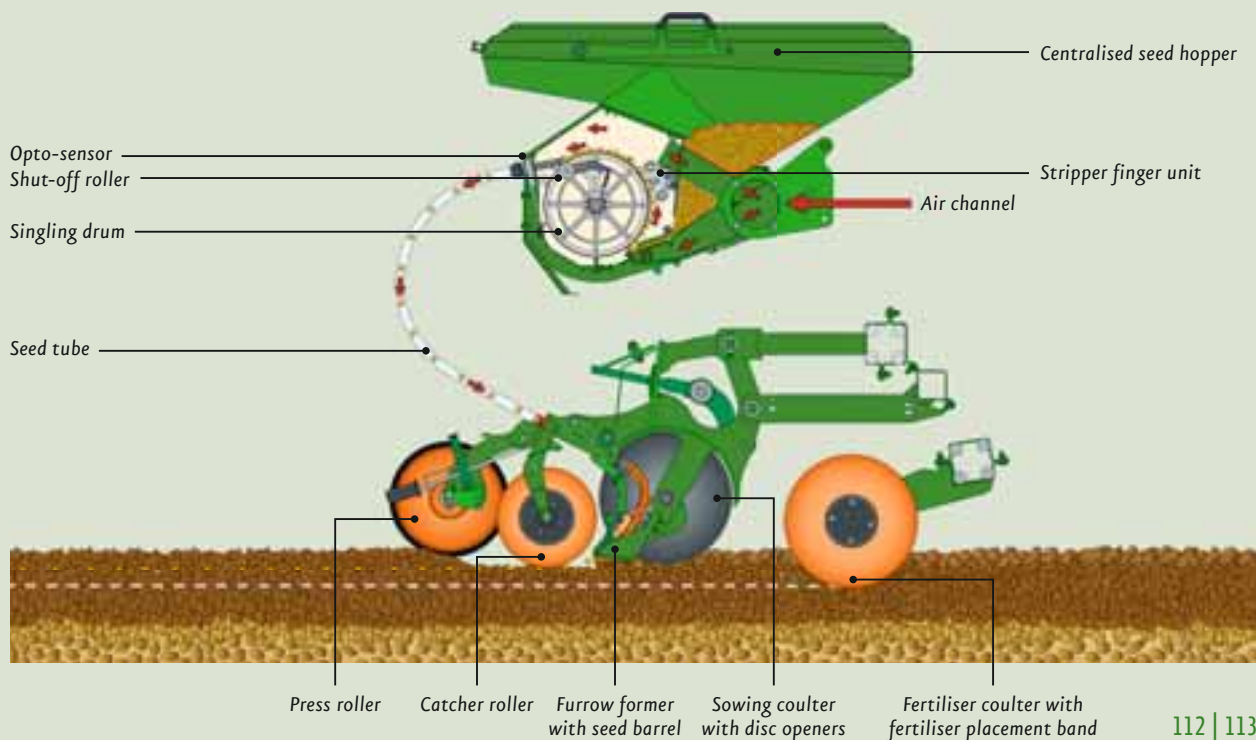
EDX 6000-TC with large centralised fertiliser and seed hopper

vancement, one of many in its history, which continues to promote its good image.

Now the AMAZONE EDX is offered in many versions, from 8 to 20 rows, for maize, sunflowers, etc., as 3-point linkage model and also as a trailed version. In the meantime, there is also equipment

for sowing rape available. The design has proved to be superb and AMAZONEN-WERKE are already considering how to use this principle for other field crops. The first field tests are very promising.

EDX Xpress-System





Chapter 14: 30 years of AMAZONE Ltd

a | The early years

Although AMAZONE machinery had been present in Britain since the 1960's through an importer – formerly Curtis Padwick and Company Limited and then Taskers Farm Machinery – it wasn't until 1982 that, under the enthusiasm of Klaus Dreyer, AMAZONEN-WERKE decided to enter into a joint venture with Tasker's former sales director, Rod Baker and AMAZONE Ltd was duly incorporated. The year prior to the launch, in summer 1982, saw AMAZONE Ltd starting to recruit staff and after an interview process carried out by Rod Baker and



Aerial view of Harworth, circa 1998, taken after the arrival of Krone products to AMAZONE Ltd.

Dieter Lenigk, then the export manager with responsibility for Britain at AMAZONEN-WERKE, Simon Brown was appointed to the role of technical service and was duly dispatched over to AMAZONEN-

The Royal Showground hosts the launch of AMAZONE Ltd to the British dealer network in April 1983.



WERKE'S Gaste headquarters to commence an intensive product training period in Germany. Peter Murray, having been taken on to look after northern sales, then joined Simon in Germany in early 1983 ahead of the start date.

It was Good Friday 1983 that saw the complete Ltd team of Rod Baker, Peter Murray and Simon Brown down at Anna Valley in Andover, headquarters of Craven Taskers, not only take over the spare parts and whole goods, but also to begin the new company. The era of AMAZONE Ltd was well and truly underway. During the rest of that weekend the parts were moved up to Mick Chandler Engineers in Burbage, Wiltshire, a few miles up the road from the Rod Baker's home in Hungerford, and duly racked up at their premises ready to commence trading after the Bank Holiday. From these humble beginnings, the steady rise of the brand began.

At the Royal Showground in Stoneleigh in April 1983, the British AMAZONE dealer network was invited to a launch of the complete product line up. Amongst those dealers present were Ernie Couzens from Ben Burgess & Co and Cec Scruton from Wilfred Scruton Ltd, these are just two of a long list of dealers that remain very much as part of the AMAZONE business today. Mounted to a humble array of MB-Trac, Leyland and David Brown tractors, the machinery on display at Stoneleigh included the Jet 801 pneumatic spreader, the D7 Super seed drill com-



The Jet 801 pneumatic spreader flies high at the Royal Show.

bination fixed to the back of a REV reciprocating harrow and the ZA-F 1204R. However, also on show here for the first time in Britain was the AMAZONE ZA-U 1001 twin disc spreader and, little did we realise at that time that this product was to become one of the most iconic pieces of machinery of all time as AMAZONE introduced 24 m fertiliser spreading to farming. As already described in an earlier chapter, the machine revolutionised fertiliser application and it sold in its thousands in Britain between 1983 and 1993; second-hand models fetch as much now

The 1984 Royal Show saw on show the 100,000 seed drill produced, a 'gold-plated' D7 Super-S Typ 30.





today as they cost new 30 years ago. With just a few fertilisers available, the Nitrogen market was dominated by Fisons Nitrotop, ICI Nitram and UKF Fertilisers Shellstar with NPK fertilisers predominantly still granular compounds rather than blends. Over those subsequent months and years there was close collaboration with John Crowe and Ted Crooks from SCAMS (Spreader Calibration and Advisory Maintenance Service) as these wide tramlines demanded a well set-up machine. In fact that close connection with John Crowe continued as, some years later, he spent time as service manager with in AMAZONE Ltd.

Locating the parts at Mick Chandler Engineers was very much a short term solution and, with an eye to the future, work soon commenced on the new premises near Lambourn Woodlands. Known as Cuckoo Copse, this was to become initially the home of AMAZONE Ltd in Britain and then eventually just AMAZONE Groundcare. The two acre site, formerly owned by an agricultural contractor began

to take shape with offices, stores area and whole goods storage being crafted out of the old MOD buildings on Membury Airfield. A year after leaving Taskers, the spares were moved again and Rod and Barbara Baker got their garage back which had been hastily converted into offices to cope with the paperwork during those early days of trading. That first year had seen AMAZONE treble its turnover in Britain and the business continued to grow with additional staff being recruited; Peter Terry came into Cuckoo Copse to run the office, David Curtis took over the southern half of the country on sales, both of whom had worked alongside Rod Baker at Taskers. At the Royal Show in 1984, which was in those days the highlight of the agricultural show calendar, AMAZONE launched the Super Jet 1600F 18 m and they also exhibited the 100,000th seed drill ever built by AMAZONE, a D7 Super-S painted gold to commemorate the occasion. Soon afterwards, Gavin Monk started looking after East Anglia with Stuart Chatfield on board in the West.

Stock ready for dispatch outside the offices at Cuckoo Copse, Lambourn Woodlands, the initial home of AMAZONE Ltd.



b | Harworth opens its doors

In the latter half of the 1980's, the business had again grown to the stage where more people were necessary: Richard Cooper was taken on to support David Curtis down south and Hamish Brown was on Scottish service alongside Jimmy Carver on sales and, in the East, Simon Brown was transferred to sales. To cover the hole left by Simon's move to sales, Trevor Brocklesby joined the company to look after service in the North & East. This additional staffing level left Peter Murray in a position to look at relocating the business to a more central region and so the late 80's saw AMAZONE purchase a green field site next to the Harworth pit, near Bawtry, where a building was put up with some additional yard space round the back. Joining the company then, to look after spare parts, was Philip Burton who, 23 years later, is still in the same role and is an important part of the AMAZONE Ltd team, a team that spans more than 230 years of service



Trevor Brocklesby (lh) and Simon Brown take a break from demonstrating at Autumn Cultivations in 1991.

Mr. Klaus Dreyer (centre) reveals the plaque and declares Harworth open as Dr. Rolf Fredericks (rh) and Mr. Rod Baker (lh) look on.





from its 27 employees. With Harworth finished in autumn 1990, Klaus Dreyer, then joint director of AMAZONE Ltd declared the premises open and quickly soon after the building was extended with a further workshop and storage area being added to the existing footprint. But even this proved inadequate and, with a patch of land available across the road at the back, this was subsequently purchased and another storage hall which included a training centre built, this second building always being referred to as 'Harworth 2'. Cuckoo Copse continued to function as regional depot for the South of England to ensure good availability of spare parts and, in order to strengthen the supply of parts in Scotland, a further satellite depot was opened in Linlithgow, just north of Edinburgh, where Brian Hamilton made sure that Scottish farmers needs were well served.



The successful tie up with Krone lasted for more than 10 years.

In the 90's, AMAZONE Ltd went on to offer a full range of both arable and grassland machinery by utilising machinery from Elho, Niemeyer, Strautmann and Krone.



c | AMAZONE & non-AMAZONE products added to the portfolio

AMAZONE Ltd was not sitting on its laurels throughout the late 1980's as sprayers had been added to the portfolio with Basil Smith and David Hart joining to bring with them a wealth of experience in the world of crop protection kit from Viccon and Everard respectively. The Super-S boom, on either the UF mounted or UG trailed models being well received by the British farmer. The way of drilling cereals had also been revolutionised with the introduction of the RPD – tyre packer – drill and crops on huge swathes of the British landscape were established with one of these, either as a three metre or four metre drill combination, and although originally with the REV reciprocating harrow on the front, this was eventually replaced by either the KG rotary cultivator or the KE rotary harrow. These crops were then fertilised with, what was initially a ZA-U 1801 spreader, but then later on with one of the new ZA-M 12-36 spreaders. What the ZA-U had done



Mr. Christian Dreyer presides over the opening of the new Active Centre in Harworth.

The Active Centre hosts visitors from all over Britain for seminars, farmer evenings, dealer training and educational activities.





to revolutionise spreading in the eighties, the ZA-M had the same effect at the start of the nineties as it made possible the ability to spread poorer quality fertilisers to greater tramline widths. In the contractor world, the ED precision seeders had been introduced taking maize drilling to a whole new era with regard to singling accuracy and forward speed. However, in the early 1990's, there was increasing pressure from the dealer network to offer a range of equipment that encompassed both arable and grass land farming. And so to fulfil this demand, AMAZONE Ltd became the Niemeyer importer offering a range of mowers, rakes and tedders as well as a plough to complement their own range of arable kit. This was subsequently added to, with Elho bale wrappers and Strautmann diet feeders, which meant that all aspects of the supply chain were then covered. Mirroring this approach was another of AMAZONEN-WERKE'S daughter companies in France who, as oppose to Niemeyer, were offering the Bernard Krone range of grass equipment alongside Elho. And so, during 1998 in Great Britain, the Krone range also came under the jurisdiction of AMAZONE Ltd, a relationship that was to successfully last for more than 10 years. This joint cooperation resulted in an amalgamation taking place between Bernard Krone (GB) Ltd and AMAZONE Ltd, the existing Krone premises at Southam closing and all the spare parts and whole goods moving to

Harworth. Some of the staff also moved over from one company to the other and one of the major assets of the Krone business that AMAZONE Ltd duly acquired was Chris Bendall. Chris, a long serving member of Bernard Krone GB Ltd on service, rapidly became part of the AMAZONE Ltd family where he remains today very much part of the furniture, still looking after service in the East and South East.

Following Rod Baker's retirement in 2004, the offices at Rowse near Saltash were closed and the AMAZONE Ltd business consolidated to its Harworth HQ; the sub-depots at Cuckoo Copse and Linlithgow had already shut over the years. Kevin Ridley took over the role as general manager and its association with Krone continued until 2009 where the diversity and complexity of the two product ranges meant that it was no longer possible to run the two side by side and Bernard Krone reopened a factory-owned operation in the UK at Micklesfield, near Leeds. This agreement came just as the AMAZONE product range was enjoying rapid expansion into high-end trailed and self-propelled sprayers with the UX and Pantera respectively, trailed drills (including the Cayena and Citan), high-speed maize drills in the form of the EDX, passive cultivation equipment (such as the Catros compact disc harrow and the Centaur tine and disc combination cultivator). The last years of the noughties saw AMAZONE double its turnover in Britain.

A Jet 1201 is tested for accuracy over the trays by SCAMS at Spreaders in Action in 1984.



This growth has continued unabated since, the legacy of which has seen AMAZONE become one of the major forces in agricultural and groundcare equipment supply. Now, under the leadership of Adrian Winnett, there is a staff of 27, 18 of which are on the road offering sales, service and logistics in support of an extensive product programme in both agriculture and groundcare. The base at Harworth has recently seen the opening of the Active Centre which is home to all aspects of service and sales training as well as being there for students, farmer groups and agronomists. This training site is imperative as the levels of sophisticated electronics continue to grow in all aspects of the business, with GPS technology now the accepted method of control. On a knowledge basis, the crop establishment trials site in the locality is now in its fourth season where different intensities of cultivation and drilling techniques are monitored for diesel consumption, power requirement, hours taken and yield generated to try and offer advice of what the best system is for Britain's arable farmers.

And this story of success augurs well for the next 30 years as the new generation join the business and looks set to carry on the tradition of – engineering advanced farming – a slogan first used in their advertising when AMAZONE Ltd was inaugurated but just as applicable today.



The 2013 AMAZONE Ltd field team.

Just one of many Roadshows and working demonstrations that AMAZONE Ltd carry out during the year.





1883
„Amazone“

