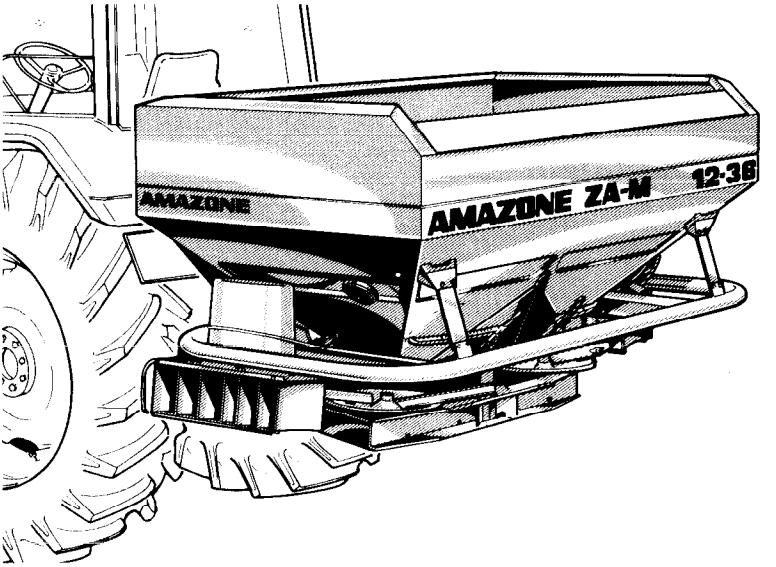
Centrifugal Twin Disc Precision Broadcaster

AMAZONE ZA-M

Instruction Manual



Please study these instructions carefully and by adhering to them make fullest use of your machine. You will then enjoy trouble-free and accurate spreading with your new AMAZONE Twin Disc Spreader.

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Subsidiaries in Great Britain and France.

Factories for: Fertilizer-spreaders. Seed drills. Soil tillage machines. Field sprayers.

Printed in F.R. Germany

We congratulate you on the purchase of your new AMAZONE fertilizer broadcaster. You have made a good choice.
Please study these instructions carefully and by adhering to them make fullest use of your machine. You will then enjoy trouble-free and accurate spreading with your new AMAZONE broadcaster.

No responsibility can be accepted by us if complaints and breakages are due to faulty manipulation or lack of maintenance.

Never put to operation your AMAZONE broadcaster before having read chapter 2 Safety technical advices and 2.2 General safety and accident prevention advice.

Your broadcaster complies only with the regulations of the agricultural health and safety authorities when in the case of repair **original** spareparts of AMAZONE are used for replacement.

By this sign we have marked all chapters which refer to your safety. Please pass this instruction hand book also to other users of this machine.

Please enter the serial number of your broadcaster here.
You will find the number stamped on the type plate.

Please always quote the machine type and serial number when ordering spareparts or making enquiries:

Centrifugal broadcaster ZA - .....

Machine serial No. .....

Contents Page

1 On receipt of the machine

Check that no damage has been caused in transit and all parts are present, otherwise no responsibility can be accepted by us or the carrier.
Before commencing work, remove all packing material, wire, etc. and check that all lubrication points are well supplied with grease, oil, etc. before use (e. g. universal joints and agitator drive chain)!

2 Technical Safety Precautions

2.1 Declined use of the machine

The **centrifugal broadcaster AMAZONE ZA-M** has been exclusively designed for the usual operation in agriculture especially for the distribution of granular fertilizers. The machine is designed to spread on slopes of up to 20 % (18°) inclination.
If the spreader is used on slopes exceeding 20 % it is no longer considered as proper use. The manufacturer does not accept any responsibility for damages resulting from this; the operator himself carries the full risk. Adhere to the manufacturer's prescribed operation, maintenance and repair conditions.
The centrifugal broadcaster AMAZONE ZA-M may only be operated, maintained and repaired by such persons who have been made acquainted with it and who have been advised about the dangers. The Health and Safety Executive advise as well as further generally accepted safety technical, working, medical and traffic laws should be adhered to.
Any damages resulting from arbitrary changes on the machine rule out the responsibility of the manufacturer.

2.2 General safety and accident preventive advice

2.2.1 **Basic principle:** Always check traffic and operational safety before putting the machine into any operation!

2.2.2 Adhere to the general rules of health- and safety precautions as well as to the hints in this instruction manual.

2.2.3 When making use of public roads adhere to the applicable traffic rules.

2.2.4 Become acquainted with all devices and controlling elements as well with their function **before** beginning with the operation. Doing this during operation would be too late!

2.2.5 Before beginning to drive check surrounding (children). Ensure sufficient visibility!

2.2.6 The clothing of the operator should fit tight. Avoid wearing loose clothing!

2.2.7 Sitting or standing on the implement during the operation or during transport is not permissible.

2.2.8 Mount the implement as prescribed. Moving characteristics, steering and braking ability are affected by mounted implements, trailers and ballast weights. Therefore take account of these effects and allow sufficient steering and braking.

2.2.9 Adhere to the maximum permissible axle loads and total weight. Refer to vehicle documents and machine's instruction manual.). When lifting the fertilizer broadcaster the front axle load of the tractor is relieved by different amounts depending on the size of the tractor. Always check, that the necessary front axle load of the tractor (20 % of the tractor's net weight) is maintained.

2.2.10 If a trailer hitch is provided it must only be used for **towing** suitable implements or **twin** axle trailers up to a maximum of 25 km/h (outside West-Germany different laws may prevail). **Single axle trailers must not be towed under any circumstances.**

2.2.11 When driving into bends mind the projection to the sides and the gyrating mass of the implement!
To avoid sideways swing of the spreader during operation stabilizer bars or chains can be fitted to the tractor's lower arms of the three-point linkage (see tractor accessory).

2.2.12 During driving never leave the operator's seat!

2.2.13 Before leaving the tractor lower the implement to the ground.
Actuate the parking brake, stop the engine and remove the ignition key!

2.2.14 Never stay or let anyone stay within the operating area!
Warning: Never come near to rotating spinner dics, danger of injury! 

2.2.15 During the calibration test watch out for danger zones due to rotating parts of the machine!

2.2.16 Filling of the fertilizer broadcaster may only be done with a stopped tractor engine, removed ignition key and closed shutters!

2.2.17 Note maximum permissible filling loads!
Maximum filling load of the ZA-M: 2000 kgs

2.2.18 If a filled machine is to be parked without the tractor the fertilizer inside the hopper should be levelled - otherwise danger of tipping over!

2.2.19 Do not place any foreign objects inside the hopper.

2.2.20 Be careful when staying or when seeing other persons staying within the throwing zone of the fertilizer broadcaster.

2.2.21 Mount the implement only with the prescribed tools.

2.2.22 Special care should be taken when the implement is coupled to or off the tractor.

2.2.23 Secure implement and tractor against unintentional rolling away.

2.2.24 Take implement only into operation only when all guards are fixed in position. When using "Opti-set" spreading discs OS 30-36 make sure the guard tube is bolted to the broadcaster.

2.2.25 Fitting the machine to the three-point linkage of the tractor bring all control levers in such a position at which an unintentional lifting or lowering is impossible!

2.2.26 When actuating the control levers for the three-point linkage never step between tractor and implement!

2.2.27 When driving on public roads with a lifted machine the lifting control lever should be locked against unintentional lowering - before leaving the tractor lower the mounted implement onto the ground and remove ignition key!

2.2.28 Nobody should stay between tractor and implement if the tractor is not secured against rolling away by the parking brake and/or by chocks!

2.2.29 When fitting to the three-point linkage the mounting categories at the tractor and the implement must coincide!

2.2.30 Working implements should only be transported and driven on tractors which are designed to do this!

2.2.31 Check maximum permissible axle loads of the tractor (see vehicle documents).

2.2.32 Do not exceed maximum permissible transport measurements of the traffic department.

2.2.33 Fit and check transport gear, e.g. traffic lights, warning- and protection devices!

2.2.34 On all hydraulically actuated pivoting parts exists danger of injury by bruising and trapping.

2.2.35 The release ropes for quick coupler should hand freely and in the low position must not release the quick coupling by themselves.

2.2.36 Affix any ballast weights always as prescribed to the correct fixing points!

Universal joint (P.T.O.) shaft

2.2.37 Use only P.T.O. shafts which are designed for the implement and which are equipped with all legally requested guards.

2.2.38 Fit and remove the P.T.O. shaft only when engine is stopped!

2.2.39 When operating with a switched-on P.T.O. shaft allow no one to stay near to the spinning P.T.O.- or universal joint shaft.

2.2.40 Guard tubes and cones of the P.T.O. shaft as well as a tractor and implement side P.T.O. guard must be fitted and kept in the correct place.

2.2.41 After switching off the P.T.O. the mounted implement may still continue to run by its dynamic masses. During this period never come too close to the implement. Begin work on the implement only after it has come to a full standstill!

2.2.42 Put to operation P.T.O. shafts only if they are completely equipped with guards also at the implement side!

2.2.43 Connect P.T.O. shaft only after the engine is stopped completely and the P.T.O. shaft has been switched off!

2.2.44 Before switching on the P.T.O. shaft take care, that no one stays in the danger zone of the implement!

2.2.45 Before switching on the P.T.O. shaft ensure that the chosen P.T.O.-speed of the tractor corresponds to the allowable implement input speed.

2.2.46 Slow engagement of the P.T.O. shaft protects tractor and spreader.

2.2.47 Switch off the P.T.O. shaft as soon as the machine's outlet openings have been shut off.

2.2.48 After removal of the universal joint shaft replace protective cap over the tractor's P.T.O.

2.2.49 Clean and grease the universal joint shaft and the P.T.O.- driven implement only after the P.T.O. shaft and engine have been stopped and ignition key pulled out!

2.2.50 Never switch on the tractor P.T.O. while the engine is stopped.

2.2.51 Stop P.T.O. always when it is not needed or when the shaft is in an adverse position!

2.2.52 Remedy of damages is to be undertaken before beginning the operation!

2.2.53 Ascertain correct fitting and securing of the P.T.O. lock.

2.2.54 Prevent P.T.O. guard from spinning by fixing the provided chain to a nearby static part (see Fig. 1b).

Maintenance

2.2.55 Liquids leaking under high pressure (Diesel fuel, hydraulic oil) can penetrate the skin and cause severe injury. When injured see a doctor immediately. Danger of infection!

2.2.56 Dispose of old oils, grease and filters as prescribed by law.

2.2.57 Check and retighten if necessary nuts and bolts regularly, initially after 3 - 4 hopper fillings.

2.2.58 When conducting maintenance work on the lifted implement always place suitable supports underneath.

2.2.59 When conducting electrical welding operations on the tractor or on the mounted implement remove cable from the generator and the battery.

2.2.60 The hydraulic system is under high pressure.

2.2.61 When searching for leaks appropriate aids should be used because of the danger of injury.

2.2.62 Before starting to do repair work at the hydraulic system relieve it of pressure by actuating the control lever accordingly and stop tractor engine.

2.2.63 When fitting the hydraulic hoses to the tractor hydraulic sockets always ensure that the hydraulic system on the tractor as well as on the implement side is without pressure.

2.2.64 Fit the hydraulic hoses to the tractor according to the advice in the instructions. To avoid wrong connection sockets and plugs should be colour coded. This helps to prevent misoperation and reduces the danger of accidents caused by it.

2.2.65 The period of use of any hose circuit should not exceed six years including a possible storing period of two years in maximum. Also when stored and used properly hoses and hose circuits do age. Therefore their longevity and period of use is limited. Deviations from the above may be accepted by the Health- and Safety Authorities and depending on experience made and the danger potential. For hoses and hose circuits made of thermoplasts other guide lines may prevail.

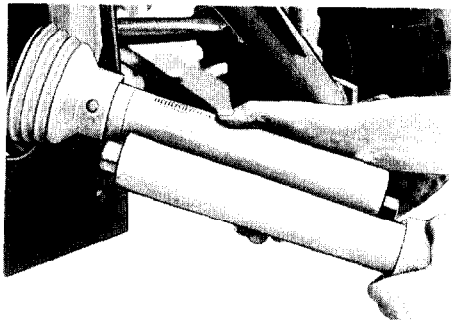

Fig. 1a

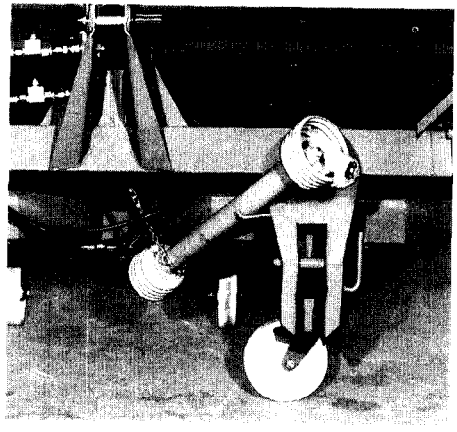

Fig. 1b

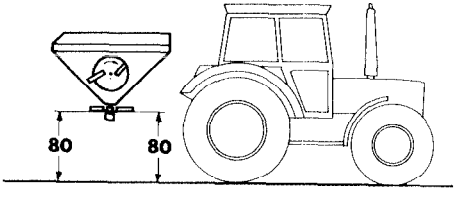

Fig. 2a

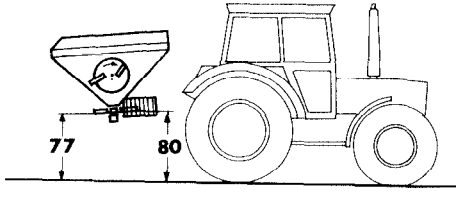

Fig. 2b

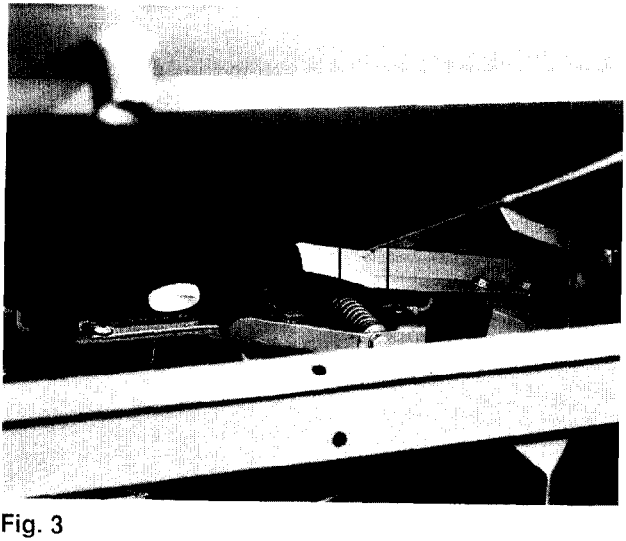

Fig. 3

3. Putting into operation

3.1 Mounting to the three-point linkage

When mounting the fertilizer broadcaster to the tractor three-point linkage it should be noted that the pins are secured properly. The top link pin with the arresting lever should be locked. The lower link pins should be secured by lynch pins.

3.2 Matching of the P.T.O. shaft to the tractor ⚠

When first mounting the machine to the tractor, the P.T.O. shaft halves should be separated and the front half should be fixed to the tractor's P.T.O. but not inserted in the implement half which remains on the implement.
Thereafter the two P.T.O. halves should be held side by side. It should be checked, that in the furthest extremes of the machine (machine on the ground or hydraulically lifted fully up) the P.T.O. tube overlap by a minimum of **6 cm** (2 1/2") and that in the shortest position (machine horizontally level) the ends of the tube do not 'bottom'. If they meet, **both ends** must be shortened by the **same amount** (Fig. 1 a). (Please also check using various angled positions of the broadcaster as stated in the setting chart.)
The two halves of the P.T.O. shaft are now ready for being joined together. Make sure, that under all working conditions the angle of the shaft **must not exceed 25 degrees** (lubricate P.T.O. shaft and tube). The P.T.O. guard is detachable.
Affix the chain of the P.T.O. guard to tho hole provided in the main frame as shown in Fig. 1b to prevent the guard from rotating.
When parking the fertilizer spreader the P.T.O. shaft should be placed into the catching hook (Fig. 1b).

3.3 Setting of the tractor's hydraulic linkage

Attention! For lowering the ZA-UM on the hydraulic three-point linkage use always only the tractor's hydraulic "position control" lever. This allows the height of the implement to be held in any hydraulic position. **The speed of lowering of a filled broadcaster must never be faster than 2 seconds.** If a hydraulic response control is available set the hydraulic throttle valve accordingly.
Note: The hydraulic control should not be operated with a higher pressure than 180 bar.

3.4 Setting up the broadcaster

3.4.1 Setting of the operation height

For normal fertilizing simply set the machine to a level height of 80/80 cm (Fig. 2 **a**). This measurement being the spreading discs above the ground or top of the crop.
At large working widths (from 27 m) with some kinds of fertilizer a large throwing width to the rear results. If it is desirable to keep the throwing width shorter to the rear it is possible to set the machine tilt to the rear using a mounting height of 80/77 cm (fig. 2 b). In this case it is important to note that all vanes must be set forward by one figure (in rotating sense of the spinning discs). For some few kinds of fertilizer an

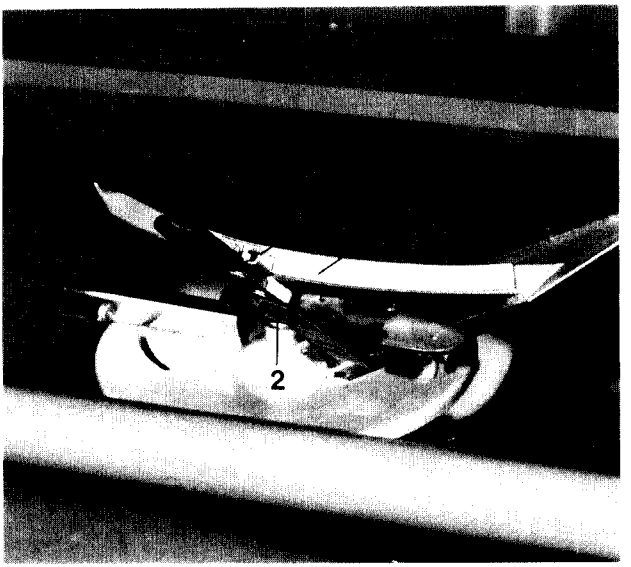

Fig. 4

	10 m			12 m			15 m			16 m			18 m		
	km/h			km/h			km/h			km/h			km/h		
	8	10	12	8	10	12	8	10	12	8	10	12	8	10	12
20	150	120	100	125	100	83	100	80	67	94	75	63	83	67	56
21	173	138	115	144	115	96	115	92	77	108	86	72	96	77	64
22	195	156	130	163	130	108	130	104	87	122	98	81	108	87	72
23	218	174	145	181	145	121	145	116	97	136	109	91	121	97	81
24	240	192	160	200	160	133	160	128	107	150	120	100	133	107	89
25	270	216	180	225	180	150	180	144	120	169	135	113	150	120	100
26	300	240	200	250	200	167	200	160	133	188	150	125	167	133	111
27	338	270	225	281	225	188	225	180	150	211	169	141	188	150	125
28	375	300	250	313	250	208	250	200	167	234	188	156	208	167	139
29	413	330	275	344	275	229	275	220	183	258	206	172	229	183	153
30	450	360	300	375	300	250	300	240	200	281	225	188	250	200	167
31	488	390	325	406	325	271	325	260	217	305	244	203	271	217	181
32	525	420	350	438	350	292	350	280	233	328	263	219	292	233	194
33	563	450	375	469	375	313	375	300	250	352	281	234	313	250	208
34	600	480	400	500	400	333	400	320	267	375	300	250	333	267	222
35	638	510	425	531	425	354	425	340	283	398	319	266	354	283	236
36	683	546	455	569	455	379	455	364	303	427	341	284	379	303	253
37	728	582	485	606	485	404	485	388	323	455	364	303	404	323	269
38	773	618	515	644	515	429	515	412	343	483	386	322	429	343	286
39	825	660	550	688	550	458	550	440	367	516	413	344	458	367	306
40	878	702	585	731	585	488	585	468	390	548	439	366	488	390	325
41	930	744	620	775	620	517	620	496	413	581	465	388	517	413	344
42	983	786	655	819	655	546	655	524	437	614	491	409	546	437	364
43	1043	834	695	869	695	579	695	556	463	652	521	434	579	463	386
44	1103	882	735	919	735	613	735	588	490	689	551	459	613	490	408
45	1163	930	775	969	775	646	775	620	517	727	581	484	646	517	431
46	1223	978	815	1019	815	679	815	652	543	764	611	509	679	543	453
47	1283	1026	855	1069	855	713	855	684	570	802	641	534	713	570	475
48	1343	1074	895	1119	895	746	895	716	597	839	671	559	746	597	497
49	1410	1128	940	1175	940	783	940	752	627	881	705	588	783	627	522

Fig. 5

exceptional rule applies. Further details about it may be taken from the separate setting chart.

For the spring spreading season when the crop has grown up to 40 cm tall, one half of the crop height should be added to the above stated disc heights above the ground (i.e. 80/80 or 80/77 cm). If the crop stands taller follow the instructions for late top dressing (para. 3.8).

If the crop stands very dense (e.g. Rape) the fertilizer broadcaster should be set at 80/80 or 80/77 **resp. above the crop.** If that is no longer possible than please also follow the instructions for late top dressing (para. 3.8).

3.4.2 Opening or shutting of the outlet openings

The fertilizer is guided through the two openings from the split hopper onto the spreading discs. These openings are shut by a hydraulic ram (Fig. 3/1) and opened by spring action (Fig. 3/2).
Shutting the lock taps ensures that the closed shutters do not open by themselves through weak spool valves or after long periods.
The shutters can be actuated independently of one another allowing the spread to one side only. The precondition for this is the availability of two hydraulic sockets which can be actuated independently from one another. At tractors with only one single acting hydraulic socket a twoway unit (option, order No. 145 600) is required.
The rods with the red caps to the left and right of the P.T.O shaft indicate whether the shutter slides are open or closed.

3.4.3 Setting the spread rate

Setting the spread rate should be conducted with the hydraulics keeping the shutter slides closed.
The spread rate is set with the aid of the two setting levers (Fig. 4/1). These function as stop to the shutter slides so that it is possible to set varying shutter openings.
The kind of fertilizer, the working width, the forward speed and the desired spread rate are the factors for the various setting figures. These are compiled in the setting chart. From the setting chart it is known (example Fig. 5) on which setting number the levers (Fig. 4/1) are to be set. To set, the thumb nuts (Fig. 4/2) are loosened slightly and the pointers on the lever (Fig. 4/3) should point to the corresponding setting figure on the scale (Fig. 4/4). Then the two thumb-nuts (Fig.4/2) are retightened.

Example:
Spreading material: Calcium Ammonium Nitrate 27 % N, BASF (white)
Working width: 15 m
Forward speed: 8 km/h
Desired spread rate: 360 kgs/ha

Setting figure for the setting levers: 32

Please refer to para 7.1 for the way of checking the basic setting of the shutter slides.

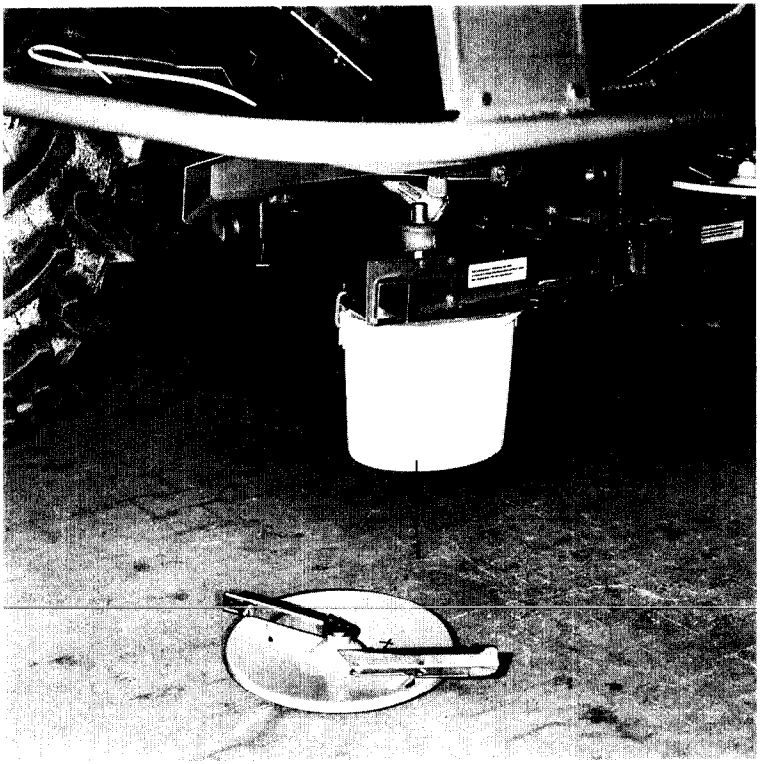

Fig. 6

3.4.4 Checking the spread rate (calibration test)

For calibrating the spread rate the spreader must be attached to the tractor and the lefthand spinner disc has to be removed. The pointer of the lefthand setting lever must be set to the setting figure taken from the setting chart.
The calibration bucket is hung beneath the left shutter opening using the holes on the frame (Fig. 6/1). This way the fertilizer can be collected during a certain calibration distance. The required forward distance depends on the working width.

Always stop drive of the machine before putting on or taking off calibration bucket.

Working bout width	required forward distance	area covered	for total spread rate multiply collected weight (kgs) by
9.00 m	55.50 m	1/40 ha	40
10.00 m	50.00 m	1/40 ha	40
12.00 m	41.60 m	1/40 ha	40
15.00 m	33.30 m	1/40 ha	40
16.00 m	31.25 m	1/40 ha	40
18.00 m	27.75 m	1/40 ha	40
20.00 m	25.00 m	1/40 ha	40
21.00 m	23.80 m	1/40 ha	40
24.00 m	41,60 m	1/20 ha	20
27.00 m	37.00 m	1/20 ha	20
30.00 m	33,30 m	1/20 ha	20
32.00 m	31.25 m	1/20 ha	20
36.00 m	27.75 m	1/20 ha	20

When calibrating high spread rates per hectare, due to the limited capacity of the collecting bucket it may be necessary to reduce the required forward distance by half and to double the multiplication factor.
The forward distance should then be driven under field conditions (with the intended forwart speed and P.T.O.-speed of 540 R.P.M.). The weight of the fertilizer collected in the bucket is to be multiplied with the stated multiplication factor to obtain the actual spread rate in kgs/ha.

Example:
Required working width: 12 m

The fertilizer collected from a forward distance of 41.6 m at the normal forward speed is 10 kgs.
Spread rate per hectare = 10 kg x 40 = 400 kgs/ha

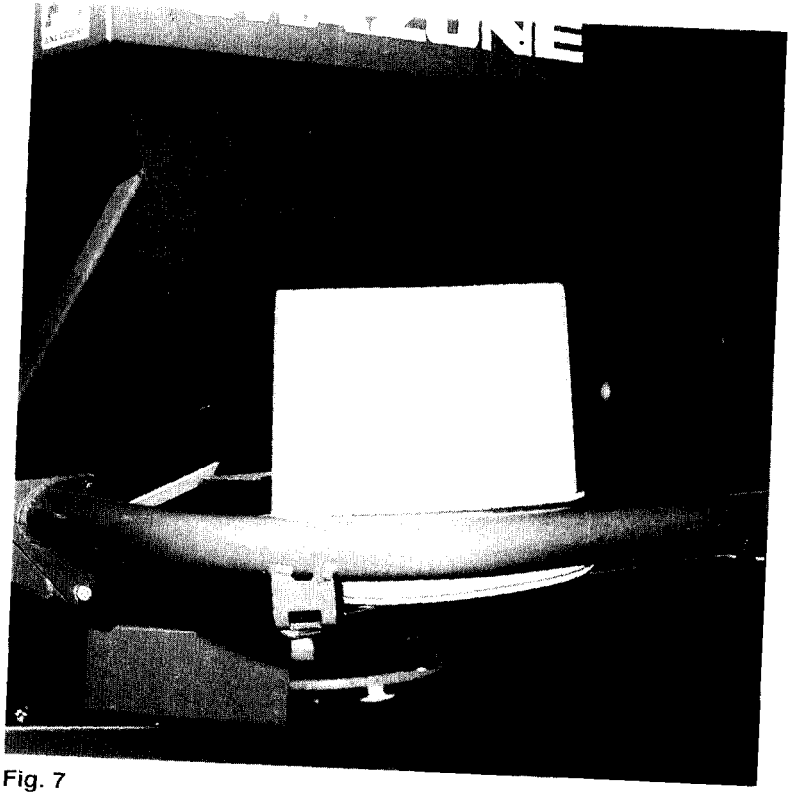

Fig. 7

If according to the calculation the spread rate deviates from the required spread rate the position of the setting lever on the setting scale should be changed either to a higher or lower figure. It may become necessary to repeat the calibration test.
After the calibration test the pointer of the righthand setting lever should be brought to the same position which had been determined by the calibration test for the lefthand setting lever.
After the calibration test the collecting bucket may be affixed to the lefthand side of the machine (Fig. 7). The calibration test should particularly be conducted with kinds of fertilizer which are not mentioned in the setting chart.

3.4.5 Setting the working width

The fertilizer spreaders of the type ZA-M can in a simple way be set to various working widths which must correspond to the tramline spacings the distance of which are always a multiple of the seed drill's working width.

The varying working widths of the AMAZONE ZA-M are obtained by various spreading discs and/or depending on the kind of fertilizer by differing settings of the spreading blades on the spinner discs.
The machine is equipped as standard with the **Opti-Set**-spreading discs. The various working widths are divided in areas for which apart from a few exceptions (see setting chart) a corresponding pair of spinner discs is available.

10 - 18 m = OS 10-18
20 - 28 m = OS 20-28
30 - 36 m = OS 30-36

As the concave opening of the spreading blades must always face the rear when passing through the centre of the machine the bushes of the discs and their corresponding spinner shafts were designed in such a way that a wrong fitting is avoided. A safety pin has been placed to the righthand spinner shaft so that only the righthand spinner disc with its two keyways can be fitted. On the spinner discs the spreading blades can be set in such a way, that the required working width is accurately obtained. In principle the Opti-Set discs can be set to spread fertilizer to such working widths which the individual types of Opti-Set discs are designed for (see above). Should there be a type of fertilizer to which this principle does not apply, please follow the special advices in the setting chart.
The accurate details as to how the blades are to be set may be taken from the summary in the seting chart (e.g. Fig. 8, Page 19).

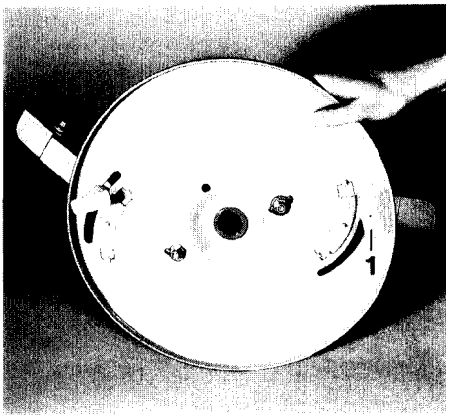

Fig. 9a

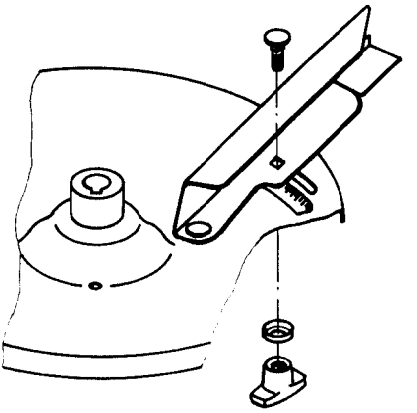

Fig 9b

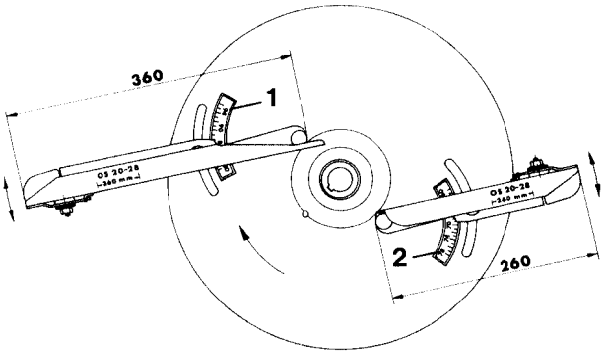

Fig. 10

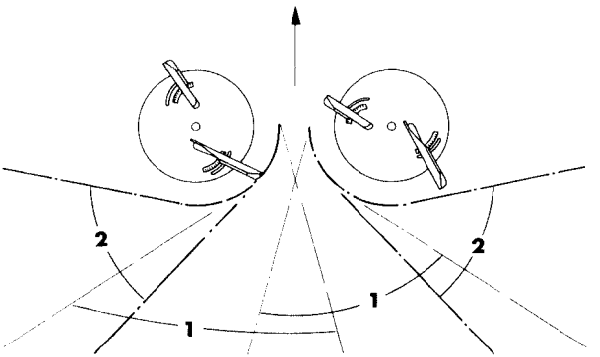

Fig. 11

Example:
Required working width: 24 m
Spreading material: Calcium Ammonium Nitrate (CAN) BASF (white)
Type of Opti-Set spinner disc: OS 20-28 (white)
Setting figure for the setting of the spreader blades: 66/87

Position of the vanes in dependance of types of fertilizer and of the working widths:

Type of fertilizer	Effective working width					Spread-rates s. page*
	20 m	21 m	24 m	27 m	28 m	
ICI Nitram 34,5 % N Prills KEMIRA Nitraprill 34,5 % N	67/86	67/86	68/89	69/91	69/92	21
Norsk Hydro EXTRAN 34,5 % N Granular	67/84	67/85	68/87	68/90	68/91	23
CAN 27 % N Granular BASF (white) CAN 27 % N Granular NSM	65/86	65/86	66/87	70/87	70/88	25

* of setting chart

Fig. 8 Excerpt from setting chart as example for setting the "Opti-Set" discs. The actual setting figures have to be taken from the latest setting chart.

For setting the spreading blades slacken only the thumb nuts beneath the spinner discs (Fig. 9a/1). It should be noted that the dished washers are fitted according to Fig. 9 b. Swivel the long spreader blades to the position 87 of the scale Fig. 10/1) and then firmly retighten the thumb nuts.
Proceed in the same way with the short spreading blades which are set on the figure 66 of the scale (Fig. 10/2) and firmly retighten them by the thumb nuts. For another type of fertilizer or another working width other figures from the setting chart may apply.
Each of the spreader blades has a defined working area (Fig. 11). The short blades determine the distribution in the middle area (Fig. 11/1).
The long spreader blades determine the distribution in the outer area (Fig. 11/2).
By swivelling the spreader blades in the direction of rotation of the discs (on to a higher figure on the yellow scale)the fertilizer will be spread further to the outer area.
By swivelling the blades against the direction of rotation the fertilizer will be spread more to the central area.

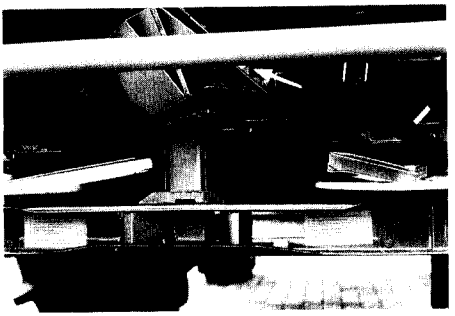

Fig. 12

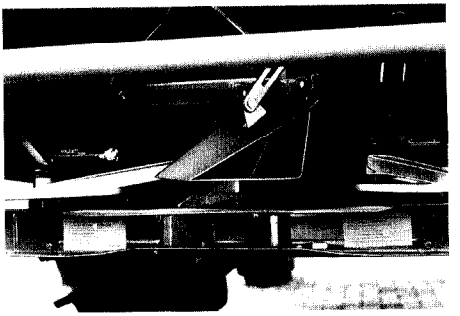

Fig. 13

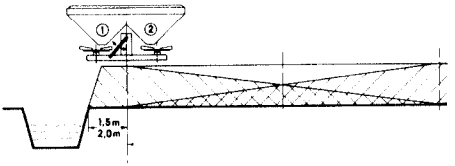

Fig. 14

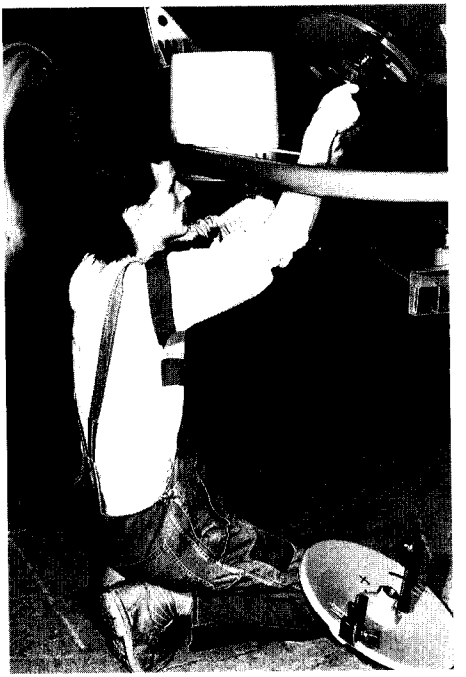

Fig. 16

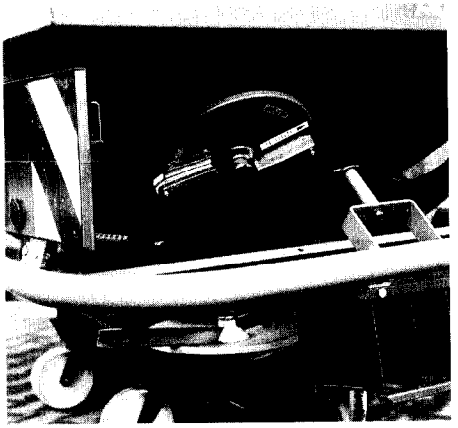

Fig. 15

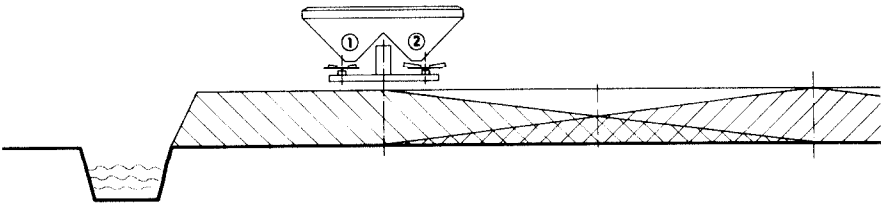

Fig. 17

Good condition of spreading vanes ensures the fertiliser be spread evenly onto the field (no "striping"). Therefore AMAZONE uses an especially wear-resistant stainless steel.
It should be understood that the spreading vanes must be considered to be a wearing part of the condition of which should regularly be checked. The vanes should be replaced before holes in the material are noticed. The lifespan of the vanes depends on the kinds of fertiliser used, the length of operation and on the spread rates.

3.4.6 Checking the working width

The working width may be checked by the **mobile test stand**. The mobile test stand may be purchases as a special option (order No. 125 900) (please refer to para. 6.2). This mobile test stand should especially be used with kinds of fertilizers which are not mentioned in the setting chart.

3.5 Trimmer

For large working widths above 27 m it is recommended to make use of the **trimmers**. The trimmer is then limiting the throw of fertilizer forward in operating direction to about the middle of the tractor-length.
At some kinds of fertilizer it is additionally possible to reduce the width throw to the rear by angling the broadcaster to the rear by setting it at 80/77 (Fig. 2 b). Please refer also to para. 3.4.1.

3.6 Boundary spreading

3.6.1 Broadcasting to one field side (centre of first tramline being 1.5 - 2 m from field side)

For an accurate onesided broadcasting the corresponding shutter slide should be hydraulically actuated and the boundary spread deflector (special option, order No. 140 600, see para. 6.4) be fitted. Fig. 12 and Fig. 13 show how the border spread deflector is mounted to the broadcaster. As shown the lefthand shutter slide must remain closed. This way the fertilizer is only thrown 1.5 - 2 m towards the closed side (Fig. 14).

3.6.2 Broadcasting towards the boundary with "Tele-Set" boundary spread discs (tramline e.g. 6 m from field side <boundary>)

The Centrifugal broadcaster AMAZONE ZA-M can be equipped with a lefthand **Tele-Set**-spinner disc (special option order No. 196 501 or 116 502, see para. 6.5). By this **Tele-Set**-spinner disc a correct broadcasting towards the field's side is possible. When not in use this disc may be fixed to the hopper wall (Fig. 15). The lefthand **Opti-Set**-spinner disc is changed for **Tele-Se**t-spinner disc (Fig. 16). Then the spread pattern has a trapezium characteristic to one side (Fig. 17).

The boundary spread disc **Tele-Set** 10-28 is equipped with two telescopic spreading blades of equal length (Fig. 18a/1) which after slackening the nuts (Fig. 18a/3) can be set to figures from 20 to 31 on the red scales; however, the nuts (Fig. 18a/4) should

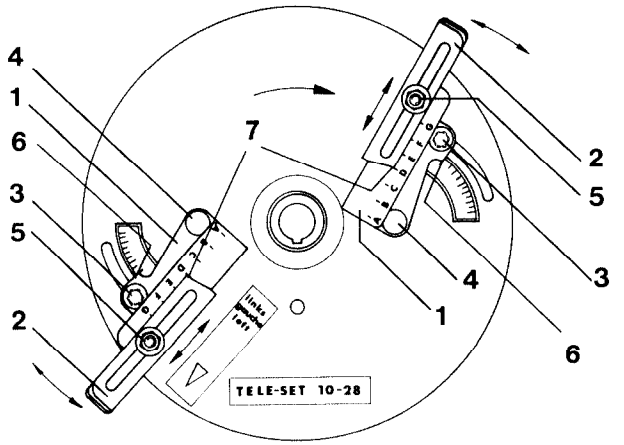

Fig. 18a

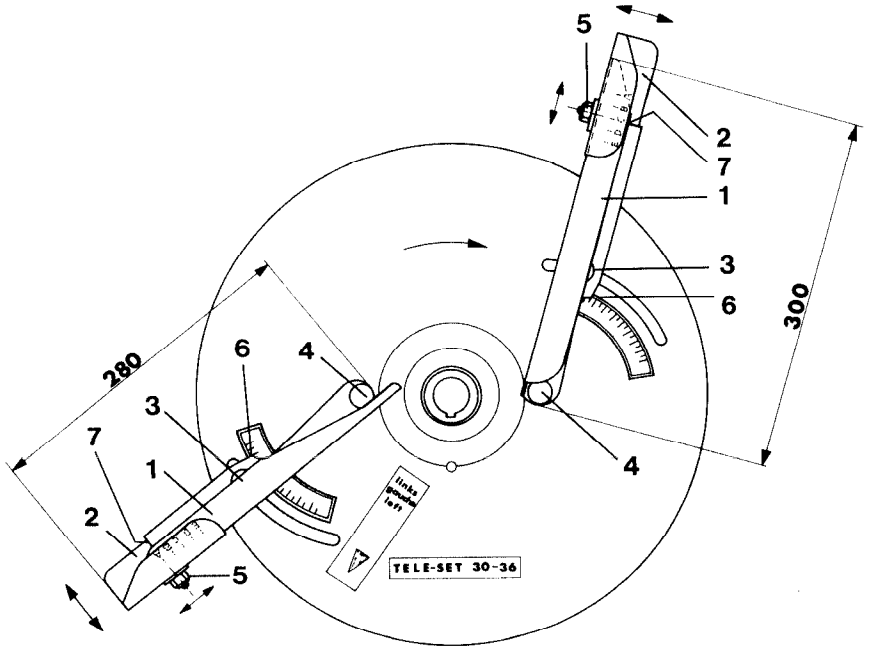

Fig. 18b

not be slackened.
The outer ends of the spreading blades (Fig. 18a/2) can telescope after slackening the nuts (Fig. 18a/5) until position G.

Principle of function:
Moving part 1 in direction 30 on the red scale: increased throwing width, steeper drop off to the sides.
Moving part 2 in direction G on the scale: increased throwing width, shallower drop off to the sides.
For the various working widths the necessary spreading blade positions can be taken from the setting chart. An extract is shown in Fig. 19 a and 19 b respectively.

Example:
Distance from the first tramline to the field side: 9 m
Used spreading material: Calcium Ammonium Nitrate (CAN)
Position according to setting chart: D21/D23
One of the telescoping spreader blades must be set to position D21, the other one to position D23.

Spacing between the tramlines		12 m	16 m	18 m	20 m 21 m	24 m	27 m 28 m
Spacing from centre of tramline to field side (boundary)		6 m	8 m	9 m	10 m 10,5 m	12 m	13,5 m 14 m
Type of fertilizer e.g. CAN Granular	one vane	A 24	B 27	D 23	E 24	G 22	G 28
	other vane	A 22	B 23	D 21	E 22	G 21	G 21

Fig. 19a

The border spread disc **TELE-SET 30-36** is equipped with two differently long swivelable and telescoping vanes (Fig. 18 b/1) which can be reset after slackening the nuts (Fig. 18 b/3) from 20 to 35 or from 40 to 58 respectively on the red scales; however, it is not necessary to slacken the nuts (Fig. 18 b/4).
The outer vane parts (Fig. 18 b/2) can be extended up to position E after slackening the nuts (Fig. 18/5).

Way of function
If part 1 is moved in direction 34 or 58 resp. on the scale:
wider throwing width, steeper drop-off at the sides.
If part 2 is moved in direction E on the scale:
Wider throwing width, shallower drop-off at the sides.

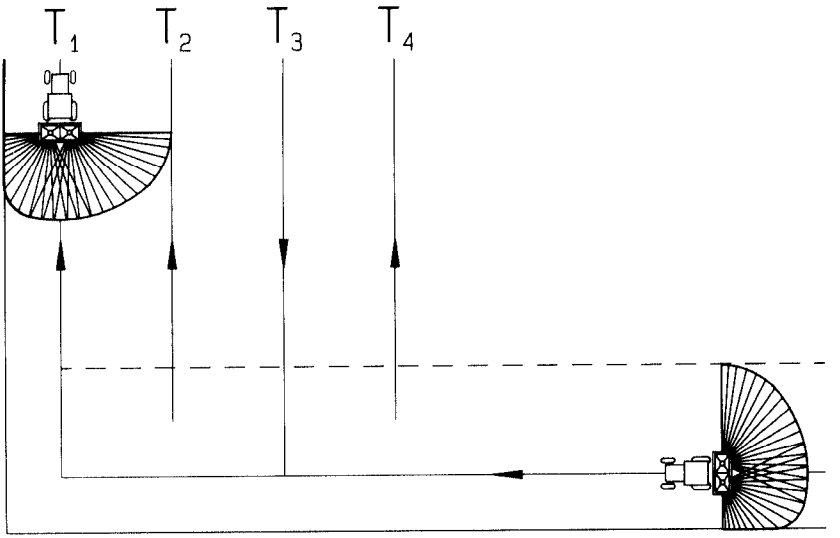

Fig. 20a

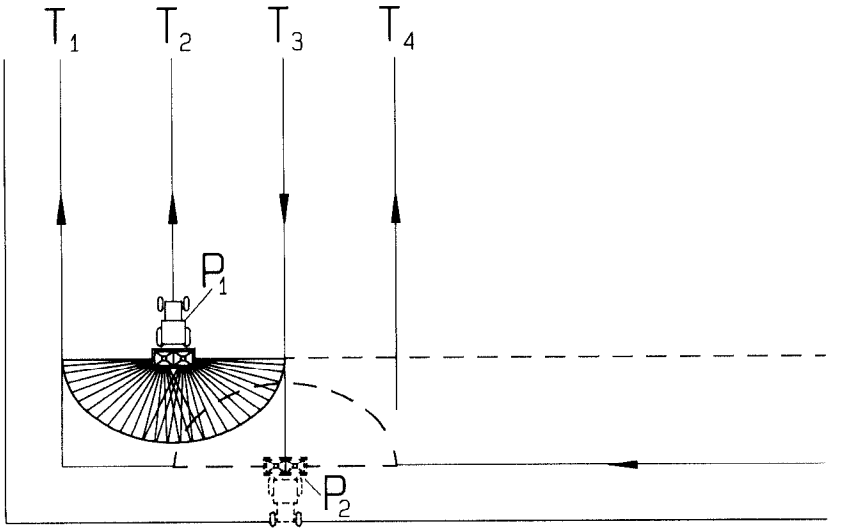

Fig. 20b

Example
Distance of the first tramline from track-centre towards side of field (border): 15 m
Fertilizer spread: CAN calcium Ammonium Nitrate
Setting according the table: A 28/A 44.

The short telescoping vane must be set to figure A 28, the long one to figure A 44.

Spacing between the tramlines		30 m	32 m	36 m
Spacing from centre of tramline to field side (boundary)		15 m	16 m	18 m
Type of fertilizer e. g. CAN Granular	one vane	A 28	C 23	D 21
	other vane	A 44	A 50	A 57

Fig. 19 b

3.7 Broadcasting on headlands

Precondition for an exact operation on the headlands is the correct positioning of the tramlines. When using the boundary spread disc **Tele-Set** the first tramline must be half the distance of the working width of the fertilizer broadcaster from the field's side (see para. 3.6.2). In the same manner also a tramline is produced on the headlands (a further tramline on the headlands with the full distance of working width is very helpful as an orientation help).
First the lefthand spinner disc **Opti-Set** with the shallow spread pattern characteristic is changed for the border spread disc **Tele-Set** with its steep trapeziumm spread pattern characteristic. Then set the **Tele-Set**-border spread disc (see para. 3.6.2).
By maintaining the preset shutter settings one drives it in the first tramline in clockwise direction along the field side (Fig. 20a). After the field has been encircled once, the border spread disc **Tele-Set** is changed for the normal spread disc **Opti-Set**.

The ZA-M broadcaster throws the fertilizer in a semi-oval pattern (Fig. 20b) to the rear and the machine restricts the forward throwing to a straight line across the spread pattern. This design feature has removed the "guessing" as to where to start and where to stop broadcasting.
If you look at Fig. 20b you will notice that the straight line of the pattern at the headlands is alternately farther away from or closer to the field's end, depending on the direction of travel.
Proceeding in the above manner is the ideal system to ensure the best possible

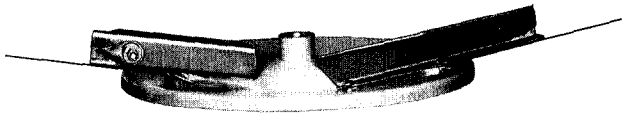

Fig. 21a

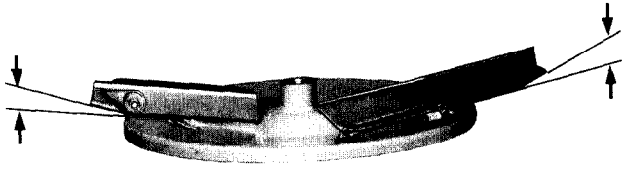

Fig. 21b

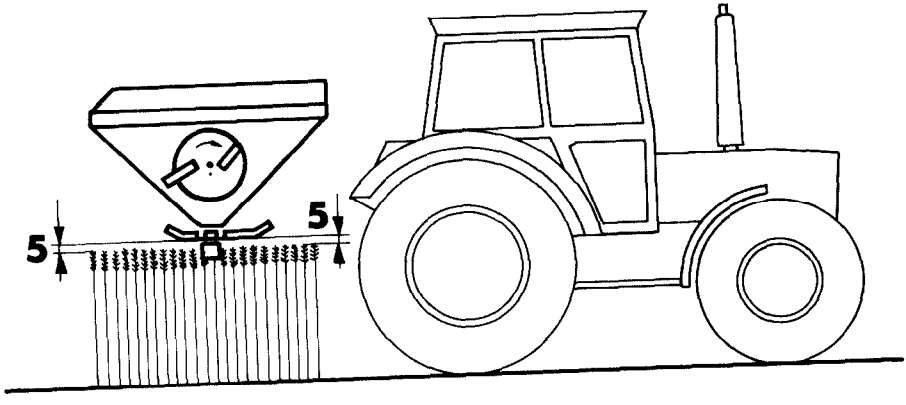

Fig. 22

overlap situation at the headlands.
Practically that means that the machine's shutter slides must be opened or closed alternately at varying distances from the headlands. When driving "to" (T2) the shutters must be opened only when the tractor has passed the second (dotted) line of the headlands. In contrary to this the shutters may only be shut when the ZA-M broadcaster is above the first tramline (P3).
The above procedure helps to avoid losses of fertilizer and over or under fertilizing, and is, therefore, environmentally friendly.

3.8 Late top dressing

The fertilizer is suplied as standard with spreading vanes by which besides the normal spreading procedure also late top dressing in crops to growth height of 1 m may be conducted.This spreading blades are equipped with "swivel-blades". For normal fertilizing the swivel-blades are left in the downward position (Fig. 21a/1). For late top dressing the swivel-blades are pushed upwards without slackening the nuts (Fig. 21b/1) which throws the curve of the fertilizer spread fan raised by a certain amount.
For late top dressing the statement of the charts spinner disc setting height of 80 cm as stated in the setting chart is no longer valid. The spinner discs must now be set at a height of approx. 5 cm (2") above the top of the grain (Fig. 22). Should the lifting height of the tractor three-point hydraulic be insufficient the lifting height can be increased by simply inserting the lower link pins of the ZA-M into the lower holes provided int he main frame. If this proves to be still insufficient a crop lowerer (special option, Order-No. see para. 6.7) may be fitted to the rear of the broadcaster.

3.9 Agitating spiral

The centrifugal fertilizer broadcaster AMAZONE ZA-M is equipped as standard with two agitator spirals in the bottom of the split hopper. These agitator spirals feed the fertilizer towards the hopper openings and ensure uniform and smooth fertilizer delivery.

3.10 Advice for spreading snail-pesticides (e.g. Draza, Mesurol etc.)

3.10.1 The AMAZONE ZA-M may in its standard execution be used for broadcasting pellets. The slug pellets (Draza, Mesurol) are supplied in pellets or similar shapes and are spread in relatively low rates (e.g. 3 kg/ha).

3.10.2 For spreading snail pellets it should be provided that the hopper outlets are always covered with the spreading material and a constant P.T.O. speed of 540 R.P.M. is maintained. For emptying the spreader place a sheet of canvas beneath it and thereafter open both shutter slides so that the spreading material can be collected without harm to the environment.

Fig. 23

3.10.3 The setting data may be obtained from the setting chart. The setting figures should be used as a guide aid. Before the first operation the correct spread rate setting should be checked (see para 3.4.4). Due to the low spread rate we recommend for the spread rate calibration test to at least triple the length of the forward distance normally used for fertilizer (then also the multiplicator is to be reduced accordingly to one third of the figure shown on the table).

3.10.4 Slug pesticides must never be mixed with fertilizers or other materials perhaps to be in a position to operate the broadcaster at another setting position (endangered environment by misapplication).

4 Special hints for a trouble-free operation

4.1 Slowly engage the P.T.O.-clutch at low engine speed (idling). Should the shear-bolt still continue to fail a special P.T.O. shaft with slip clutch is available as an option (see para. 5.3).
When exchanging the p.t.o.-shafts care should be taken that after pulling off the standard p.t.o.-shaft as well as the flange the key remains in the keaway of the gearbox input shaft.
The special p.t.o.-shaft should be secured against movement by the hexagon bolt fitted.

4.2 To be able to change the spinner discs these should be turned by hand until the free hole in each disc shows in direction to the machine's centre.

4.3 Certain spreading materials may cause an increased wear on the spreading vanes (e.g. materials containing silicates, magnesium or excello).

4.4 Shut hydraulic ball block valves when intending to travel longer distances on the road or for longer operation pauses since otherwise, if the tractor valves leak, the shutters may open by themselves.

4.5 When parking the fertilizer broadcaster hang the P.T.O.-shaft into the catching hook provided.

5 Maintenance

5.1 Apply grease to the shutter guides after every operation!

5.2 After use wash out the hopper and clean fertilizer daily from all working surfaces and mechanisms.

5.3 The 8 mm diameter bolts supplied loosely with the machine are supposed to be used as spare shear bolts by which the P.T.O. shaft is connected to the gearbox input shaft. Always apply grease to the input shaft before fitting the P.T.O. shaft. Before starting after longer pauses the P.T.O. shaft should be removed and grease reapplied to the input shaft again to ensure that no corrosion prevents a shearing in case of emergency.

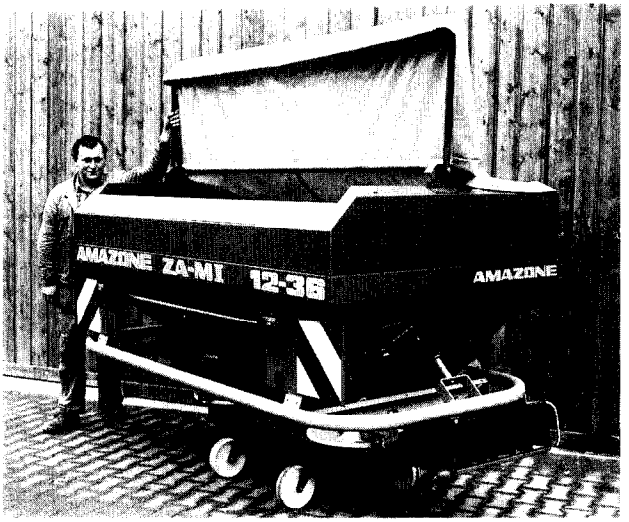

Fig. 24

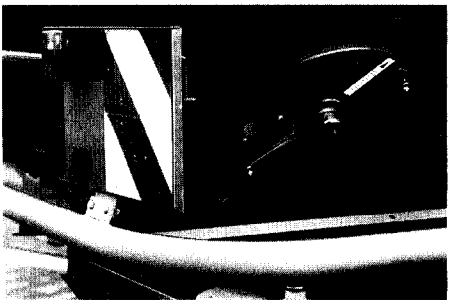

Fig. 25

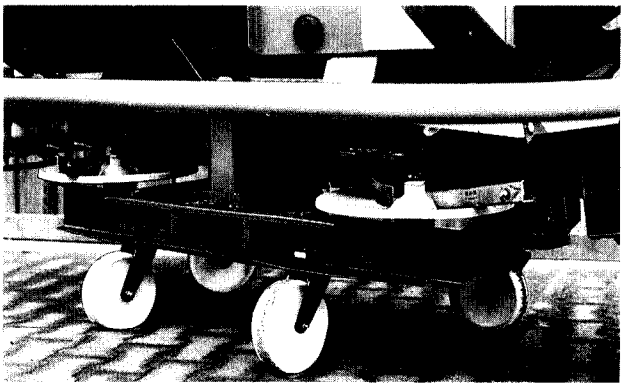

Fig. 26

5.4 Also after longer pauses between operations clean the agitator drive chain and lubricate it. The chain can be reached from the lower front of the machine by opening the steel door.

6 Special executions and options (pls. see page 31)

Note: As standard specification varies by country it is possible that some of the "special optional equipment" stated in the following is included in the scope of delivery of your machine and some of the "standard specifications" mentioned in this manual are left off.

6.1 Various special Opti-Set spinner discs for other working widths and for special fertilizers (refer to the setting chart).

6.2 Mobile working width test stand

6.3 Trimmer
The tubular brackets of the trimmer are bolted to four points (Fig. 23).

6.4 Border spread deflector

6.5 Tele-Set border spread spinner discs.

6.6 Hopper cover
For fixing of the hopper cover to the ZA-UM bolt the supplied conversion angles beneath the cover tube (Fig. 24/1) to the hopper. Furthermore the clamping rail of the canvas should be bolted to the vertical front wall of the hopper after having drilled holes accordingly (Fig. 24/1).

6.7 Crop lowerer for late top dressing in tall crops.

6.8 Special P.T.O. shaft with slip-clutch (recommended at tractors with hydraul. clutch to prevent frequent failing of shear pins.)

6.9 Two-way hydraulic control kit

6.10 Two-way hydraulic control with extended hoses for system tractors.

6.11 Traffic light kit
The traffic light kit is fixed to the rear fixing brackets provided for fixing of the trimmer (Fig. 25/1).

6.12 Trolley kit
To simplify the manoeuvring on the farm yard and attaching of the broadcaster to the tractor a roll kit (Fig. 26) can be obtained.

6.13 Special control for spread rate alteration during operation (increased or reduced settings).

6.14 Electric shutter control with Amatron II.

6.15 Electric ±control with switchbox SKU.

7 Hints for adjustments

7.1 Checking the basic setting of the shutter slides

To ensure a symmetrical spread pattern of both spinner discs shutter openings were set by the factory. In case of any malfunction they can be checked as follows:

Secure the two shutter setting levers (Fig. 4/1) on the rear of the machine in position 8 by tightening the wing nuts (Fig. 4/2). Then open the two shutter slides by using the tractor's hydraulics. Now the hopper outlets should be opened to such an extent allowing a 12 mm drill to be easily pushed through.

If the opening is too narrow readjust the shutter setting lever to a higher setting no. until the drill can be easily pushed througt. Thereafter it is necessary to readjust the pointer of the shutter lever (Fig. 4/3) to position 8.

If tho opening is too wide proceed vice versa.

7.2 Amount of pressure in the tractor's hydraulics

The pressure of the hydraulic system of the tractor should never exceed 180 bar in order to avoid bending dammage to the shutter setting levers.