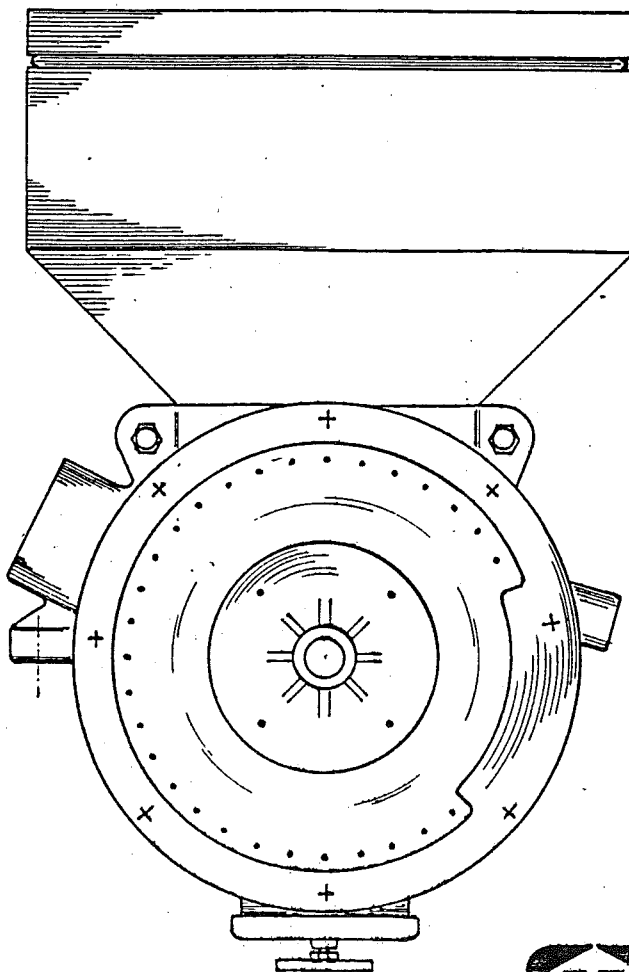


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user - manual

PRECI - 3000

PRECISION DRILL



K KONGSKILDE

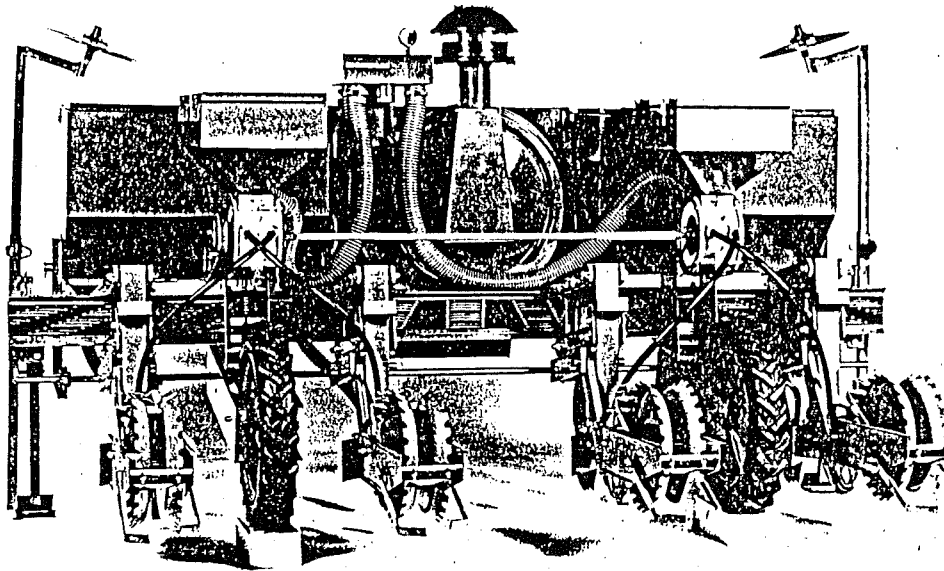
TABLE OF CONTENTS

	Page
Introduction	1
1. Technical information	2
2. Working principle of the sowing unit	4
3. The sowing element	5
4. Safety precautions	7
5. Preparing the machine for the field operation	8
6. Drilling	12
7. Fertilizer equipment	14
8. Maintenance	16
9. Trouble shooting	19
10. Accessories	20
11. Exploded view drawings	26

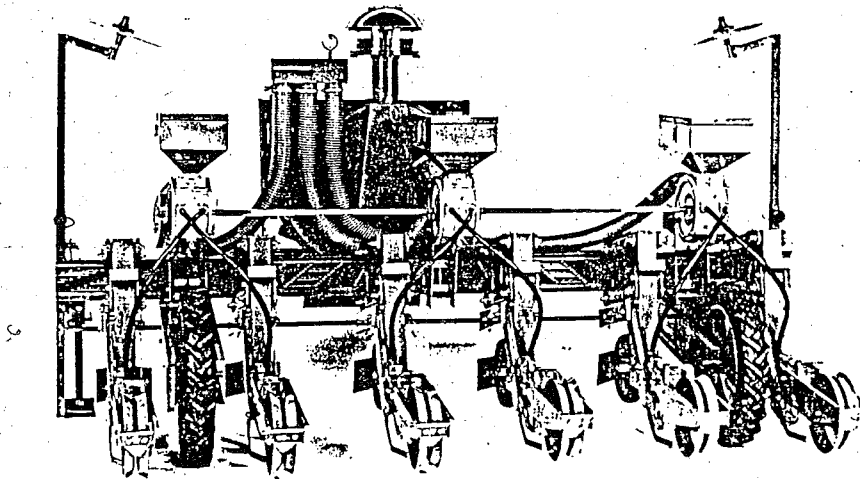
INTRODUCTION

The Précí-Sem precision drill has two basic models.

Model 104: a four row precision drill with fertilizer equipment and sowing elements for drilling coarse seeds (standard: maize).



Model 206: a six row precision drill with sowing elements for drilling fine seeds (standard: sugar beet).



For various other seeds (beans, peas, sunflowers) a machine can be delivered on request. These special machines can be composed of parts of the two basic models.

1. TECHNICAL INFORMATION

	MODEL 104 (maize)	MODEL 206 (sugar beet)
Width (m)	3,00	3,00
Depth (m)	1,85	1,50
Height (m)	1,60	1,60
Weight (kg)	580	600
Number of rows	4	6
Row spacings (cm)	65-85	30-55
Sowing depth (cm)	0-8	0-5
(adjusting) steps (cm)	0,5	0,5
Seedbox capacity (l)	40	40
Fertilizer hopper capacity (l)	160	
Drive wheels	4,00 x 16 AS-Farmer	4,00 x 16 AS-Farmer
on order:	5,00 x 15	
Tyre pressure (bar)	1,5	1,5
Power take-off	1 3/8" (6)	1 3/8" (6)
on order:	1 3/8" (21)	1 3/8" (21)
PTO-revolution (rot/min)	max. 540	max. 540
Overpressure (bar)	0,08	dependent on kind of seed normally 0,05
Three point suspension	Category II	Category II
Sowing distances (standard)	7,5 8,5 9,5 10,5 11,5 12,5 13,0 13,5 14,5 15,0 16,0 17,0	9,5 10,5 11,5 13,0 14,0 14,5 15,5 16,5 17,5 18,5 19,5 20,5

Codes sowing plates

KIND OF SEED	<p>CODES</p> <p>number of cells x diameter of cell (mm) - circle diameter between cells (mm)</p>
<p>Maize</p> <p>Sugar beets (pelleted)</p> <p>Sugar beets (unpelleted)</p> <p>Beans</p> <p>String beans</p> <p>Sunflowers</p> <p>Round green peas</p>	<p>36 x 4,2 - 215</p> <p>30 x 2,2 - 213</p> <p>30 x 2,0 - 215</p> <p>36 x 5,2 - 210</p> <p>36 x 4,2 - 213</p> <p>30 x 2,8 - 214 (coarse seed)</p> <p>30 x 2,5 - 214 (standard)</p> <p>30 x 2,0 - 214 (fine seed)</p> <p>45 x 4,8 - 210</p>

2. WORKING PRINCIPLE OF THE SOWING UNIT

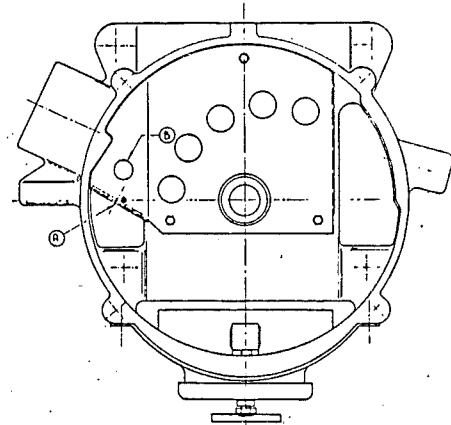
The task of the separator, the heart of each precision drill, is to take the seeds one by one from the seed stock in order to create the possibility of drilling the seeds separately.

The unique separator of the Précis-Sem is capable of drilling two rows.

The separator is connected to a blower. This blower gives an overpressure in both the separator and the seedbox. Synthetic sowing plates, mounted on each side of the separator (surrounded by seed holes) take care of the seed metering. The sowing plates move against sealing flanges. They close the separator on both sides. The sowing plates are driven by the left drive wheel of the machine.

At the bottom of the separator the sowing plate takes the seed out of the seed stock (owing to the overpressure). Then, the rotating sowing plate causes the seeds to pass a fixed selector. This selector pushes away the extra seed from the holes in order to get only one seed per hole.

When the holes are opposite the flow-out opening the holes are closed by the sealing flanges on the outside of the sowing plate. The seed is then caught in an airstream. By means of air as a medium of transport the seed is blown to the furrow.



For an accurate seed metering system with all kinds of seeds there are various sowing plates available for various kinds of seeds. Each sowing plate has its own code (see technical information).

Different sowing distances are obtained by changing chains and gear wheels.

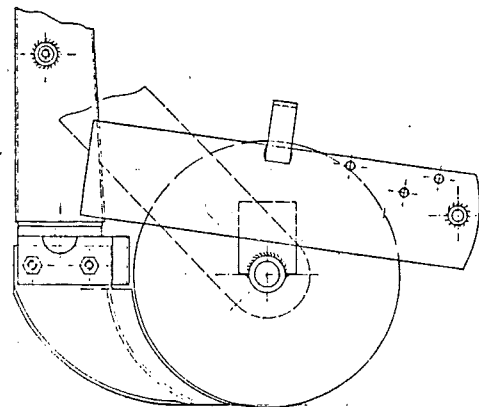
The separator for sugar beets has some adjustments for maize. This is necessary because the weight of the sugar beet seed is very low. These adjustments are:

- * the vertical channel inside is made longer
- * some holes in the plates (that lead the airstream) inside the separator are closed. The one under the airstream inlet (A) and the first hole on each side of the vertical plates (B). In total three holes (see drawing).

The separator blows the seed at a high speed to the seed furrow. For catching and fixating the seed in the furrow we need a special coulter + seed pressure wheel (see drawing).

By means of a special path in the coulter the seed is blown into the furrow under the seed pressure wheel. This wheel catches the seed and fixates it into the underground. In this way the seed gets into good contact with the moist underground. This leads to fast germination of the seed.

Most of the time it is not necessary to drill as deep as with the conventional sowing systems. Our system fixates the seeds into the underground, while the conventional systems drop the seeds onto the underground.



3. THE SOWING ELEMENT

The sowing element of the Précí-Sem knows two basic types:

3.1. A sowing element for coarse seeds

3.2. A sowing element for fine seeds

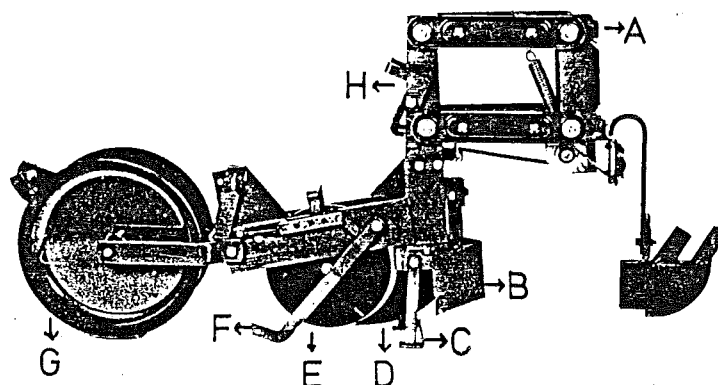
For special crops combinations of both elements can be made.

3.1. Sowing element for coarse seeds

A. Parallelogram

Each sowing element is suspended in a parallelogram in order to follow the field contours independently on each other. This provides optimal drilling depth.

The parallelogram can be spring loaded in order to achieve better penetration into heavy soils.



B. Clod deflector

The clod deflector removes clods and stones out of the drilling track.

C. Support leg

To protect the coulters (when the machine is placed on a hard floor) each sowing element has a support leg. Driving forwards causes the support legs to tilt back.

D. Coulter

The drill coulter makes the seed furrow and puts seed in the centre of the furrow. There are two kinds of coulters, one for the coarse kinds of seeds, the other one for the fine kinds of seeds (specially for sugar beets).

E. Seed pressure wheel

The seed pressure wheel fixates the seed into the bottom of the furrow. In this way the seed comes into contact with the moist soil. The seed pressure wheel is driven by the right drive wheel to prevent the seed pressure wheel from slipping. A rubber scraper keeps the wheel clean.

F. Seed coverer

The seed coverer covers the furrow with a loose layer of soil. The coverer can be spring-loaded.

G. Soil pressure wheel

The soil pressure wheel presses the soil alongside the furrow. On top of the seed remains a loose layer of soil. The soil pressure wheel is also used for depth adjustments.

Farmflex soil pressure wheels can also be delivered.

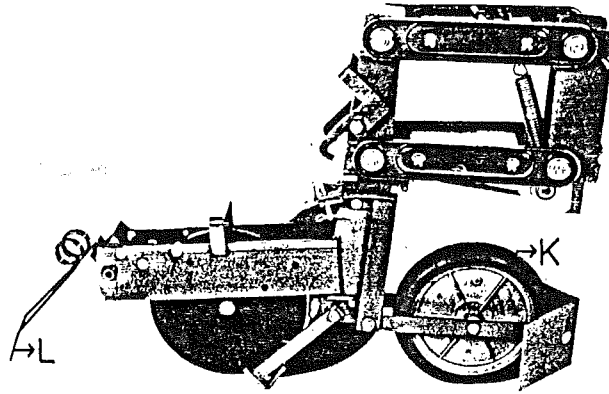
H. Parallelogram locking

During transport the parallelogram can be locked.

3.2. Sowing element for fine seeds

This sowing element is almost equal to the one described in section 3.1.

There are some adaptations for a more accurate depth adjustment.



K. Depth wheel

The drilling depth is adjusted by means of the depth wheel in front of the coulters. This wheel also compresses the loose seed bed in front of the drill coulters.

L. Spring tines

The spring tines behind the coulters put a minimal loose layer of soil over the seed. Consequently oxygen and heat can reach the seed fast, which is necessary for fast germination.

It is also possible to mount farmflex soil pressure wheels instead of spring tines. These wheels can be spring-loaded.

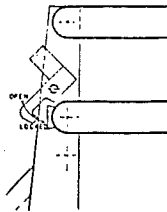
4. SAFETY PRECAUTIONS

1. The power take-off must be equipped with a safety guard. This safety guard must be provided with a safety chain to prevent rotation.

NOTE: when carrying out repairs or alterations to the machine, always make sure to switch off the power take-off first.

2. Make sure that all guards are always in the right position and that they are safely secured when the machine is in operation.
3. The blower is designed for maximally 540 RPM on the PTO-shaft. Never run with a higher RPM as this may cause damage to the blower and transmission.

4. During transport the parallelograms must always be locked (see drawing). They will hang steadily when driving on bumpy roads.



5. In case of transport over roads the markers must be locked in vertical position. Turn the marker discs half revolution, then the discs will be within the machine width.
6. Always lower the support legs in front of the tool bar when the machine is disengaged from the tractor. Put a pin in each support leg.

5. PREPARING THE MACHINE FOR THE FIELD OPERATION

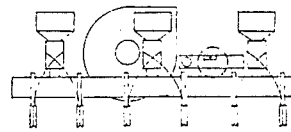
5.1. Coupling

Connect the machine to the tractor. When doing this the first time make sure that the power take-off is the right length.

IMPORTANT

When lifting the machine on the three point suspension the PTO-shaft is shortened. When the PTO-shaft is still too long, damage may be caused to both the tractor and the blower. So, always check the length of the PTO-shaft beforehand. If necessary, adjust the length. De-burr tubes and remove chips after this. Be sure you leave no chips in the telescope pipes because these can cause fast wear of the PTP-shaft pipes. Apply grease to both telescope pipes.

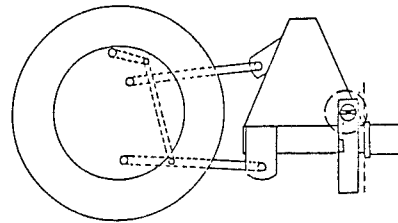
Adjust the tractor's lower links so that the tool bar will hang in horizontal position (see drawing 1.)



drawing 1

Adjust the top link of the tractor so that the front face of the tool bar will be in vertical position (see drawing 2.)

This is very important for a correct (horizontal) position of the drill coulter. The drill coulter has to move in horizontal position through the seed furrow. Always check this after a few meters of drilling.



drawing 2

On the wheel frame of the sugar beet machine is a waterlevel mounted. This is to check the horizontal position of the drill coulter.

5.2. Row distance

With the division marked on the tool bar it is easy to adjust the correct row distance. If you loosen one bolt, the parallelogram can be moved onto the tool bar. Make sure that the tracks of the tractor fit the row spacing, so check the position of the three point hitch and the track width as well.

5.3. Markers

The markers can be used for centre line marking and track marking.

On the arm of the marker is a stop. With this stop it is possible to find back the adjustment of the marker arm after having turned the markers for transport over the road.

If the marker track is not clear enough, increase the disc angle.

Sometimes it is necessary to shorten the marker arm at the first adjustment of the marker arm length. The markers, namely, are also prepared for centre line marking.

5.4. Scrapers

Adjust the scrapers on the wheels (metal soil pressure wheel, synthetic seed pressure wheel) so that the wheels keep clean. Specially the seed pressure wheel must keep clean. The scrapers may not touch the wheels.

5.5. Spring-load

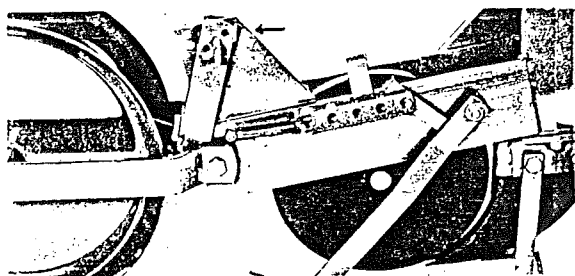
The parallelograms, the covereres and the farmflex soil pressure wheels (accessories for sugar beets) can be spring-loaded.

NOTE

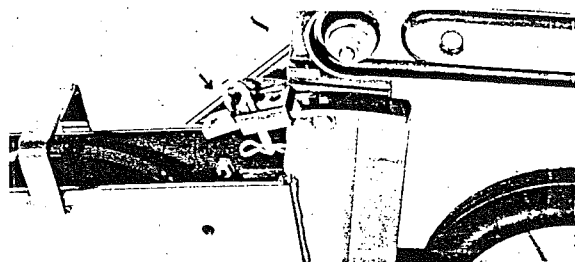
Only use spring-load, if it is really necessary (hard soil conditions). Too much spring load can decrease the plant germination.

5.6. Sowing depth adjustment

On the sowing element for coarse seeds (model 104) the sowing depth is adjustable by means of the adjustable soil pressure wheel. It is an easy pin-hole construction (see drawing). The sowing depth is adjustable from 0 - 8 cm by steps of 0,5 cm.



On the sowing element for fine seeds (model 206) the sowing depth is adjustable by means of the adjustable depth wheel. Also with an easy pin-hole construction (see drawing). This gives a very accurate depth adjustment. For fine seeds this is very important. The sowing depth is adjustable from 0 - 5 cm by steps of 0,5 cm.



ADVICE

Adjust the sowing depth of each element accurately; a correct adjustment of the sowing depth conduces to a faster germination (see note on page 4). Therefore, check the sowing depth after a few meters of drilling and correct it if necessary.

5.7. Clod deflector

The clod deflector should only push aside clods and stones and should not move soil. By loosening one bolt it is possible to adjust the stone deflector in vertical position.

5.8. Shear pin

The shear pin protects the drive mechanism of the sowing discs against too much overload. The shear pin is fitted at the beginning of the drive near the left drive wheel. When the shear pin breaks, always check the cause first. Repair this before mounting a new shear pin.

5.9. Adjustment of sowing distances

The sowing distance can be adjusted by means of alteration in the drive. This gives maximally 12 different sowing distances. A certain sowing distance implies a certain amount of plants per hectare (amount of seeds/hectare).

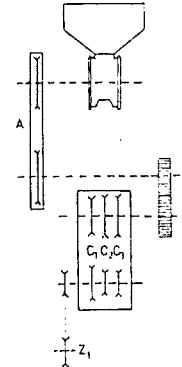
Subjoined table gives a view of the amount of seeds that belongs to a certain sowing distance (cm) and to a certain row distance (cm).

ROW DISTANCE (CM)											
	37,5	40,0	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	
sowing distance (cm)	5,0	533.300	500.000	444.400	400.000	363.600	333.300	307.700	285.700	177.800	250.000
	6,0	444.400	416.700	370.400	333.300	303.000	277.800	256.400	238.100	222.200	208.300
	7,5	355.600	333.300	296.300	266.700	242.400	222.200	205.100	190.500	177.800	166.700
	8,5	313.700	294.100	261.400	235.300	213.900	196.100	181.000	168.100	156.900	147.100
	9,5	280.700	263.200	233.900	210.500	191.400	175.400	161.900	150.400	140.400	131.600
	10,5	254.000	238.100	211.600	190.500	173.200	158.700	146.500	136.100	127.000	119.000
	11,5	231.900	217.400	193.200	173.900	158.100	144.900	133.800	124.200	115.900	108.700
	12,5	213.300	200.000	177.800	160.000	145.500	133.300	123.100	114.300	106.700	100.000
	13,0	205.100	192.300	170.900	153.800	139.900	128.200	118.300	109.900	102.600	96.200
	13,5	197.500	185.200	164.600	148.100	134.700	123.500	114.000	105.800	98.800	92.600
	14,0	190.500	178.600	158.700	142.900	129.900	119.000	109.900	102.000	95.200	89.300
	14,5	183.900	172.400	153.300	137.900	125.400	114.900	106.100	98.500	92.000	86.200
	15,0	177.800	166.700	148.100	133.300	121.200	111.100	102.600	95.200	88.900	83.300
	15,5	172.000	161.300	143.400	129.000	117.300	107.500	99.300	92.200	86.000	80.600
	16,0	166.700	156.300	138.900	125.000	113.600	104.200	96.200	89.300	83.300	78.100
	16,5	161.600	151.500	134.700	121.200	110.200	101.000	93.200	86.600	80.800	75.800
17,0	156.900	147.100	130.700	117.600	107.000	98.000	90.500	84.000	78.400	73.500	
17,5	152.400	142.900	127.000	114.300	103.900	95.200	87.900	81.600	76.200	71.400	
18,5	144.100	135.100	120.400	108.100	98.300	90.100	83.200	77.200	72.100	67.600	
19,5	136.800	128.200	114.000	102.600	93.200	85.500	78.900	73.300	68.400	64.100	
20,5	130.100	122.000	108.400	97.600	88.700	81.300	75.000	69.700	65.000	61.000	

amount of plants (plants/ha)

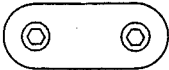
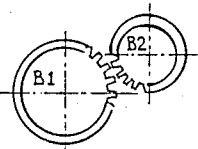
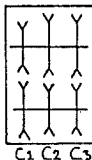
The sowing distance is adjustable by means of changing the three drive sets A, B and C (see drawing).

- A: The chain wheel cassette. On the cassette is at one side number 1 and at the other side number 2. Make sure that the number is always readable (upright) when mounting the cassette (this in order to have the tensioner always in the correct position).
- B: The gear wheels. They are coloured red (26 teeth) and black (29 teeth).
- C: A chain wheel combination set. When you are standing behind the seed drill, the left gear combination is C1, the middle combination C2 and the right combination C3.



Chain wheel Z1, delivered as an accessory, gives the possibility of an other area of sowing distances. The chain wheel can be mounted on the axle of the left drive wheel.

This table gives a view of the sowing distance adjustment. (the same table can be found on the lid of the seed hopper)

AMOUNT OF CELLS OF SOWING PLATE				ADJUSTMENT OF GEAR WHEEL DRIVE						
36 maize beans		30 sugar beets sunflowers								
sowing distance (cm)					B1	B2	C1	C2	C3	
standard	Z=21	standard	Z=21							
7.5	9.0	9.5	11.0	1	black	red	●			
8.5	10.0	10.5	12.5	2	black	red	●			
9.5	11.5	11.5	13.5	1	red	black	●			
10.5	12.5	13.0	15.5	2	red	black	●			
11.5	14.0	14.0	16.5	1	black	red		●		
12.5	14.5	14.5	17.5	1	black	red		●	●	
13.0	15.5	15.5	18.5	2	black	red		●		
13.5	16.0	16.5	19.5	2	black	red		●	●	
14.5	17.5	17.5	20.5	1	red	black		●		
15.0	18.0	18.5	22.0	1	red	black		●	●	
16.0	19.5	19.5	23.0	2	red	black		●	●	
17.0	20.0	20.5	24.5	2	red	black		●	●	

6. DRILLING

6.1. Filling the seed hoppers

Check, before filling the seed hoppers whether the valve at the bottom of the separator is closed correctly. Fill the seed hoppers and close the lids carefully. After drilling you can empty the seed hoppers by removing the valve at the bottom of the separator.

NOTE

Never remove the lid of the seed hopper when the blower is running. The overpressure will blow the seed out of the seed hopper immediately.

6.2. Unlocking the parallelograms

Unlock the parallelograms

6.3. Starting the blower

Switch on the power take-off of the tractor. Do this with a low engine RPM. This is to prevent overload of the transmission. Increase the RPM slowly until the pressure indicator gives the right overpressure. This is when the plunger is in the middle of the window. For coarse seeds (maize, beans) the overpressure is now about 0.08 bar.

Never run the PTO-shaft faster than 540 RPM!

6.4. Air pressure

During drilling there must continuously be an overpressure in the separator. If the pressure in the separator is lowered too much, the seeds will come off the holes of the sowing plate. After the correct overpressure has been realised, the sowing plates must rotate about $\frac{1}{4}$ of a revolution before there is any seed in front of the flow-out opening. Therefore lower the machine and move forward approximately 2 metres before starting to drill or turn the left drive wheel till the sowing plates are filled with seed.

NOTE

Too low a pressure causes more failures!

Too high a pressure causes more doubles!

6.5. Drilling

Check after a few meters of drilling the following points:

- * the sowing depth of each row
- * the sowing distance
- * the seed covering
- * the row distance
- * the marker adjustment
- * the vertical position of the tool bar (see drawing on page 8)

6.6. Driving with the machine

Never drive backwards without lifting the machine above the ground, otherwise the coulters will be clodged with soil and consequently be blocked.

The parallelograms can be damaged too.

When starting to drill lower the machine gradually. Lift it out of the ground as soon as you stop.

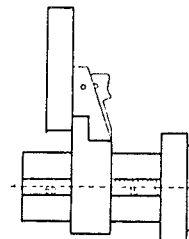
7. FERTILIZER EQUIPMENT

On model 104 standard fertilizer boxes are mounted, thus making it possible to apply fertilizer to each row.

The fertilizer is dosed by means of a fertilizer metering unit for each row (with force feed rollers). This guarantees an accurate distribution. It is also possible to mount more feed cells under one box (maximally 4 units).

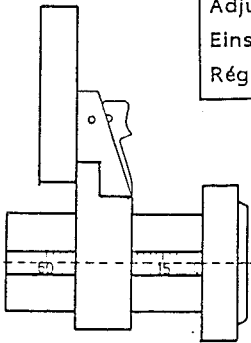
The fertilizer quantity is adjusted by means of a handle (see drawing). By turning this handle the fertilizer quantity is either increased or decreased.

If the force feed roller moves into the feed cell, the quantity increases. If the force feed roller moves out of the feed cell, the quantity decreases.



A blocking on the handle protects the handle from turning after the adjustment. The numbers on the scale in the handle help to adjust the correct quantity of fertilizer. The handle is rightly adjusted if the number is at the blocking. The scale has steps of 3 numbers, which means that one revolution of the handle is 3 steps, so 3 → 6 → 9 → 12 etc. Each revolution has 4 possible fixations. In the table for the fertilizer quantity only the quantities for complete revolutions are mentioned, not the steps between.

The table is only a recommendation, applicable to granular fertilizer. In the lid of the fertilizer box the same table is to be found.

	Instelling kunstmesthoeveelheid (kg/ha) Adjusting the fertilizer quantity (kg/ha) Einstellung der Düngermenge (kg/ha) Réglage de la quantité de fertilisant (kg/ha)				
	Rijenafstand in cm Row spacings in cm Reihenabstand in cm Espacement en cm				
	37,5	50	70	75	80
3	50	40	25	25	25
6	95	70	50	50	45
9	140	105	75	70	65
12	180	135	95	90	85
15	225	170	120	110	105
18	275	205	145	135	130
21	320	240	170	160	150
24	370	280	200	185	170
(27)	415	310	220	(210)	195
30	465	350	250	230	220
33	515	385	275	255	240
36	570	425	305	285	265
39	615	460	330	310	290
42	670	500	355	335	310
45	715	535	380	360	335

Test

Fertilizer equipment for fertilizer other than granular fertilizer can be tested by yourself.

Remove the chain that drives the hexagonal axle of the feed cells. Place a socket spanner No. 17 on the hexagonal axle to turn the axle. Adjust the dosage handle to a certain position (e.g., if your fertilizer quantity must be about 200 kg/ha and your row distance is 75 cm, take position 27 (see table) and you will be near it).

Fill the box with fertilizer. Catch the quantity of one outlet when turning the hexagonal axle 129 times. Weigh this quantity and multiply the weight by 11.1. Now you have the quantity of fertilizer of one feed cell per hectare (that is with the adjusted position of the dosage handle).

If the result is not as desired, do the test again with an other position of the dosage handle.

Starting point for this test is that per 100 running meters in the field the hexagonal axle that drives the feed cells makes 43 revolutions.

Cleaning of fertilizer boxes

Clean the fertilizer boxes regularly. Wet fertilizer can form a hard crust in the boxes, which may cause rust in the boxes soon. Therefore, clean the boxes regularly (e.g., with a high pressure sprayer). Leave the boxes to dry before filling them again with fertilizer.

At the bottom of each feed cell is a small opening. This opening is to remove the water out of the feed cell after cleaning it. Wet fertilizer can block this opening. Therefore, make these holes open (if necessary) before cleaning the fertilizer boxes.

IF POSSIBLE, ONLY USE DRY FERTILIZER!

8. MAINTENANCE

8.1. Lubrication

- Power take-off : grease the universal joints after every 8 working hours
grease the telescoping pipes after every 8 working hours, make sure there is always enough grease between both pipes, otherwise the pipes will wear very fast.
- Markers : grease the markers every 8 working hours
- Farmflex depth wheel : grease the depth wheel after every working week
- Chains : oil the chains if necessary

8.2. Retightening

On a new machine all bolts are to be retightened after the first working day. Check the bolts once more after the first working week, particularly those of the three point suspension. The parts will first have to "mould" themselves to each other. Due to this bolts can come loose.

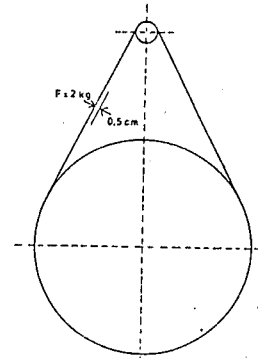
Apart from this you should take care that the bolts are tight at any time.

8.3. V-belt tension

Check regularly whether the V-belts are tight, especially if they are new.

New V-belts normally require adjustment after 15 minutes and then again after 2 -3 hours work. The belts of a new machine have been adjusted for the first time at the factory.

In order to check the V-belts the belt guard should be removed. Apply a force of 2 kg at the centre of the span. The deflection distance then has to be 5 mm (see drawing).



If the belts need tightening, loosen the four bolts securing the blower bracket and tighten the belts with the two tightening screws.

Remember to retighten the four bolts that secure the blower bracket.

When replacing the belts it is recommended to use Gates belts, type XPZ 1600 or belts of the same quality which have the longest possible life.

8.4. Chain adjustment

Check the tension of the chains regularly. Some chains have spring-loaded tensioners, which need not be adjusted normally.

The following chains must be checked for the right tension:

* for the driving of the sowing plates:

- the chain of the left drive wheel
- the chain in the cassette

* for the driving of the seed pressure wheels

- the chain of the right drive wheel that drives the hexagonal axle
- the vertical chain of each sowing element.

The chain for the seed pressure wheel can be adjusted as follows:

First remove the hexagonal axle in order to be able to check the chain of each parallelogram separately.

Remove the guard of the bottom drive chain, loosen the bolts of both chain tensioners and adjust the chain. Tighten the bolts again.

Now turn the seed pressure wheel one complete revolution by hand. Check the tension during this revolution; when there is too much tension on the chain, turning the seed pressure wheel feels heavy at some points.

In this case the chain tensioner should be loosened slightly.

The other chains can be adjusted the same way.

8.5. Bearings in parallelograms

The parallelograms can move up and down by means of 8 conical bearings. These bearings can be retightened.

The bearings must be without much play. So, tighten the bolts correctly, but take care that the parallelogram can still move smoothly. This is necessary in order to follow the contours of the field.

IMPORTANT

It is important that the parallelograms should move freely at any time. Because of this it is important to clean and grease the bearings if necessary and certainly after the sowing season.

The procedure to do this is as follows: first dismount the two parallelogram arms above, not the four arms at a time, because then it is difficult to rebuild the parallelogram. After removing the arms you will see synthetic cups on the bearings; remove these. Clean the surface of the conical bearings and make the surface smooth. Grease the surface and clean the synthetic cups. If they are worn too much they should be replaced. Mount the cups again. Clean the parallelogram arms too and mount them again. Now clean the other two arms.

8.6. Sealing flanges

The sowing plates move against the sealing flanges. There should be no impurities between both of them so as to have as little friction as possible. Due to this a number of grooves have been made in the sealing flanges. Through these grooves the dirt can escape. If the weather is very dry the blower sucks a lot of dust out of the air and blows it into the separator (despite the cyclone). The impurities will then block the grooves. This gives friction as a result of which the sowing discs will run heavily. Then it is necessary to clean the grooves in the sealing flanges.

Clean the sealing flanges also very good after the sowing season. Grease the sealing flanges with a thin layer of oil to protect the sealing flanges against rust. Although the sealing flanges are galvanized, the zinc may fade away in due course of time, because the sowing plates move against the sealing flanges during drilling. If the zinc is gone the sealing flanges can start to rust. Then there will be too much friction.

8.7. Drilling coulter

The drilling coulter should always be sharp. Specially for drilling sugar beets a sharp coulter with the shape of a V is required. Check this regularly. Coulters that are worn out do not only cause bad sowing results but can also decrease the seed germination. Replace coulters that are worn out or weld the coulter back to the original shape. Use a new coulter as example.

8.8. Seed pressure wheel

Check the synthetic seed pressure wheels for damage regularly. Damage to the seed pressure wheels can influence the precision drilling.

8.9. Sowing disc

Check the sowing discs for damage regularly. Also check if all the holes are open. Damage to the periphery of the sowing discs can cause resistance during the rotation of the sowing discs. This can influence the precision drilling.

8.10. Cyclone

Most of the dust that is sucked up by the blower is filtered out by the cyclone. Under very dry conditions with much dust in the air the cyclone may very quickly get filled with dust. Then the cyclone should be cleaned immediately (sometimes it is even necessary to do this several times a day). If there is too much dust in the air you can put an extra pipe between the cyclone and the blower, thus raising the blower above the dusty air.

8.11. Pressure indicator

The pressure indicator shows you how much overpressure the machine needs. The plunger must be in the window for the right overpressure. The overpressure on that level of the plunger, is mentioned on the machine. It is good to check the pressure indicator with a manometer before each new sowing season. This will guarantee sowing without any problems during the season.

After-season service

Clean the machine carefully and grease all moving parts by means of a thin layer of oil.

Store the machine in a dry place protected against wind and humidity if it will not be used for a long time.

9. TROUBLE SHOOTING

FAILURE	CAUSE	REMEDY
Too many doubles	too high an air pressure	reduce the air pressure
Too many missers	too low an air pressure	increase the air pressure
	too high a driving speed	lower the driving speed
	leaks in the separator	repair the leaks
	cells are blocked	clean the cells
Seed on top of the soil	sowing depth not deep enough	increase the sowing depth
	coulters are worn out	replace the coulters
Blower does not give enough pressure	V-belts are not adjusted properly or are worn out	adjust or replace V-belts
	loss of air due to leaks	make sure all tubes and connecting elements are properly fastened
Wrong drill spacing	wrong adjustment	adjust the drill spacing as indicated in table
	Drive wheel slips	check and clean, if necessary, sowing plates and drive
Drilling too deeply	clod deflector goes too deeply	adjust clod deflector
	too high a spring-load	reduce spring-load of the parallelogram
Drill coulter does not penetrate soil properly	hard soil	increase spring-load of the parallelogram
	the sowing coulters are worn out	replace sowing coulters
Sowing discs do not rotate	shear pin is broken	replace shear pin (clean sowing disc first)

10. ACCESSORIES

10.1. Farmflex soil pressure wheels

Instead of the metal soil pressure wheels for the sowing element of model 104, there are also farmflex wheels. Two kinds of farmflex soil pressure wheels can be delivered: 370 x 165 mm

500 x 175 mm

With these wheels it is possible to drill even when the soil is moist. Normally you can use the small farmflex wheel 370 x 165 mm (the separator and seed hopper do not press on the sowing element as with conventional systems).

Under extreme conditions of the soil it is better to use the big farmflex wheel 500 x 175 mm. Because this bigger wheel is further removed from the sowing coulter, the depth adjustment is not as accurate as with the small wheel.

Instead of the spring tines for the sowing element of model 206 there are also farmflex soil pressure wheels. These are useful when the soil is moist. The farmflex soil pressure wheels move freely behind the sowing element. The wheels can be spring-loaded.

10.2. Areameter

The areameter is mounted on the left wheel frame (drive wheel of the sowing plates). The wheel is the reference. Each revolution of the wheel is counted (circumference of the wheel is about 2,00 meters).

With a conversion factor it is possible to calculate the area (in square meters) that a machine with a 3 meter work width has drilled. This is multiplier 6. To get the area in hectares the number has to be divided by 10,000.

For machines with work widths of 4.5 meters and 6.0 meters the multipliers are 9 and 12.

Example of areacalculation at a fixed position of the areameter

POSITION METER (REVOLUTIONS)	SOWED AREA (HECTARE)		
	3 METER WORK WIDTH	4,5 METER WORK WIDTH	6,0 METER WORK WIDTH
500	0,30	0,45	0,60
1000	0,60	0,90	1,20
1500	0,90	1,35	1,80
1666	1,00	1,50	2,00
2000	1,20	1,80	2,40
2500	1,50	2,25	3,00
3000	1,80	2,70	3,60
3332	2,00	3,00	4,00
3500	2,10	3,15	4,20
4000	2,40	3,60	4,80
4500	2,70	4,05	5,40
4998	3,00	4,50	6,00

10.3. Hydraulic marker change

Normally the markers are changed by hand. It is possible to mount a hydraulic marker change on the machine. Then you can change the markers with the hydraulic system of the tractor.

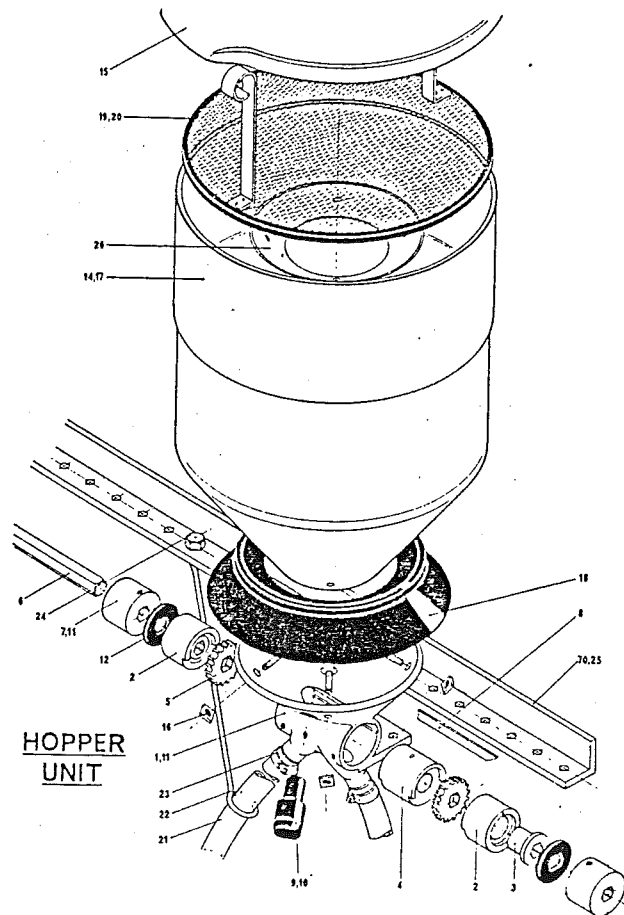
10.4. Granular applicator

A microband granular applicator can be mounted on the drill. This granulator applicator scatters granular into the sowing furrow behind the coulter and the seed pressure wheel. The height of the pipe that scatters the granular into the furrow can be adjusted.

The granular applicator is mounted on the wheel frames with a supplied frame. Make sure, the granular hoppers are right above the sowing elements. Thus the outlets of the hoppers are also right above the sowing elements, so that the granular can easily flow to the seed furrow through the synthetic tubes. Then the tubes run at an angle which will allow the granular to flow to the delivery point without bridging. Various drive pulley combinations supply various sorts of granular in various quantities (see table on the next page).

In the granular applicator synthetic rotors of 6 mm are standard mounted. When mounting the rotors always use the feeler strip. Make sure that the dimples on the housing bearings and spacer are mounted upwards. When the wearing strip(s) is (are) worn out, it (they) should either be moved to an un-used section, by sliding it (them) through the metering unit, or be replaced, otherwise the application rate will increase.

Use only dry granular. This is absolutely necessary for a good working applicator. Therefore, keep the granular in a closed pack until you really need it. Always close the lid of the hopper!

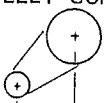


QUANTITY OF GRANULAR WITH THE 6 MM ROTOR

NOTE

The figures in the table are the amount of grams for 1000 meters of drilling.

For the calculation of the quantity in kg/ha the figures in the table should be divided by the row distance (cm).

PULLEY COMBINATION 	TEMIK 10G Gypsum	CURATERR	MOCAP 20G	VYDATE
$3\frac{1}{4} \times 7''$ $4 \times 7''$ $4\frac{1}{2} \times 7''$ $5 \times 7''$ $4 \times 5''$ $4\frac{1}{2} \times 5''$ $4 \times 4''$ $5 \times 4\frac{1}{2}''$ $5 \times 4''$ $7 \times 5''$ $7 \times 4\frac{1}{2}''$ $7 \times 4''$ $7 \times 3\frac{1}{4}''$	308 370 420 460 515 588 644 728 812 896 1008 1120 1378	540 660 750 840 940 1040 1160 1280 1460 1650 1780 2040 2420	140 174 196 218 246 280 308 341 380 431 476 537 661	218 268 302 336 380 425 476 526 594 661 739 828 1019

The values in the table are only a recommendation. You can check this yourself in practice. Therefore, catch the granular of one rotor during 42.25 revolutions of the right drive wheel of the machine. Multiply this weight by 10 and divide it by the row distance. Then you will have the quantity of granular in kg/ha.

MOVE THE WEAR STRIP INTO THE METERING UNIT REGULARLY! (guide-line: 1 x per 10 ha/row)
 (longest side up)

10.5. Control equipment

The control equipment for the Präci-Sem consists of the following components:

- * central control box (monitor)
- * seed detection sensors
- * microswitch
- * bundle of cables

Central control box (monitor)

The monitor is standard prepared for 6 sensors (6 rows). It is possible to deliver one with 4 or 6 sensors (switch inside the monitor).

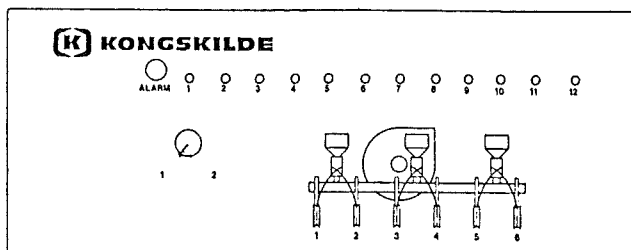
On the front of the monitor are 12 yellow leds, 1 red led for the alarm

and 1 green led to check if the monitor is on. As drawn on the front, the first row is the left row when standing behind the machine.

On the front is also an on/off switch and a switch with the alternatives 1 and 2. This is for the amount of holes in the sowing disc: position 1 = disc with 30 holes

position 2 = disc with 36 holes

When a led burns (then also the alarm burns) there is something wrong with the row the led of which burns (not enough or no seed).



Seed detection sensors

The sensors are mounted at the end of the seed transport tubes above the drill coulter. The sensor detects the seeds that are blown through the tube. Because the seeds in the tube have a high velocity, the sensor needs to be very sensitive and is, because of this, very vulnerable. To protect the sensor the electronic compound is poured into resin. This means that if a sensor is broken you have to replace the whole sensor. It is not possible to repair the sensor.

The sensors are waterproof. Never open a sensor if it is not really necessary.

Microswitch

The microswitch (also waterproof) is mounted on one of the separators. The microswitch registrates each revolution of the sowing plates and passes this signal on to the monitor. This signal is the reference for the error reporting. Each revolution the monitor must count 30 or 36 seeds.

Bundle of cables

The bundle of cables makes the connection between the sensors/microswitch and the monitor. With special butt-straps or screw connections in the various components good fixed connections are possible. Because of this, there is very little chance of disturbances.

The bundle consists of separate cables, so that, in case one cable is damaged, not the whole bundle has to be replaced.

WORKING PRINCIPLE

When the monitor is switched on, all leds will light up one by one (from left to right). This means that all the leds are O.K. and that the monitor is functioning. After this all leds go out. The monitor is now ready for use.

Now the drilling can start. The monitor will count all seeds that pass through the sensor of each row, till the microswitch gives the signal that the sowing plates have made one revolution. Now the monitor compares the counted seeds of each row with a reference value. If the number of the counted seeds of a row is below the reference value, the led of that row will light up to show that something is wrong. The alarm led (red) will light up too. If during the next revolution of the sowing disc the counted seeds are again below the reference value, the led stays on. If the counted seeds are above the reference value the led will go out.

The reference values are: for the sowing plate with 30 holes → minimally 27 seeds

for the sowing plate with 36 holes → minimally 32 seeds

If there are less seeds than this minimum, a led will light up.

Beside this error reporting after one revolution there is a check on five revolutions of the sowing plate. After five revolutions starts the monitor with the so-called "monitoring". This means the monitor adds up the seeds of each row of the five last revolutions. If from that moment at each revolution minimally 27, respectively 32 seeds have been counted, but if the total of the five revolutions is below 142, respectively 171, then the led of the row concerned will start blinking (the alarm will light up as well) during the next revolution of the sowing plate. If there have been counted less than 27, respectively 32 seeds, the led will burn continuously irrespective of the amount of seeds counted in the last revolutions.

A blinking led means a lot of missing seeds. This can happen if:

- * the seed hopper is almost empty
- * seed holes are blocked
- * the machine drives too fast

If the monitor is switched on at a moment that you start drilling, it may occur that after one revolution the leds will light up. This is due to the fact that in the first revolution not all holes were filled with seed. This can also occur after the first five revolutions.

Electric connection scheme

Inside the monitor is a large butt-strap with screw connectors to connect the sensors. Each sensor has three connection strings: S = Signal (sensor output)

V = Power Supply (+ 12 V)

G = Ground (- pole battery)

For each sensor (1 up to 12) these letters are mentioned on the butt-strap (e.g. for sensor 3: 3S, 3V, 3G).

Inside the sensor is a short butt-strap with 3 screw connectors. The middle screw connector is the S, the screw connector on the side of the silver coloured photo cells is the G, the screw connector on the other side is the V.

ATTENTION

Never change the V and G, otherwise you will damage the sensor.

The three strings of the microswitch are connected to the screw connectors marked:

MM: (Microswitch make contact)

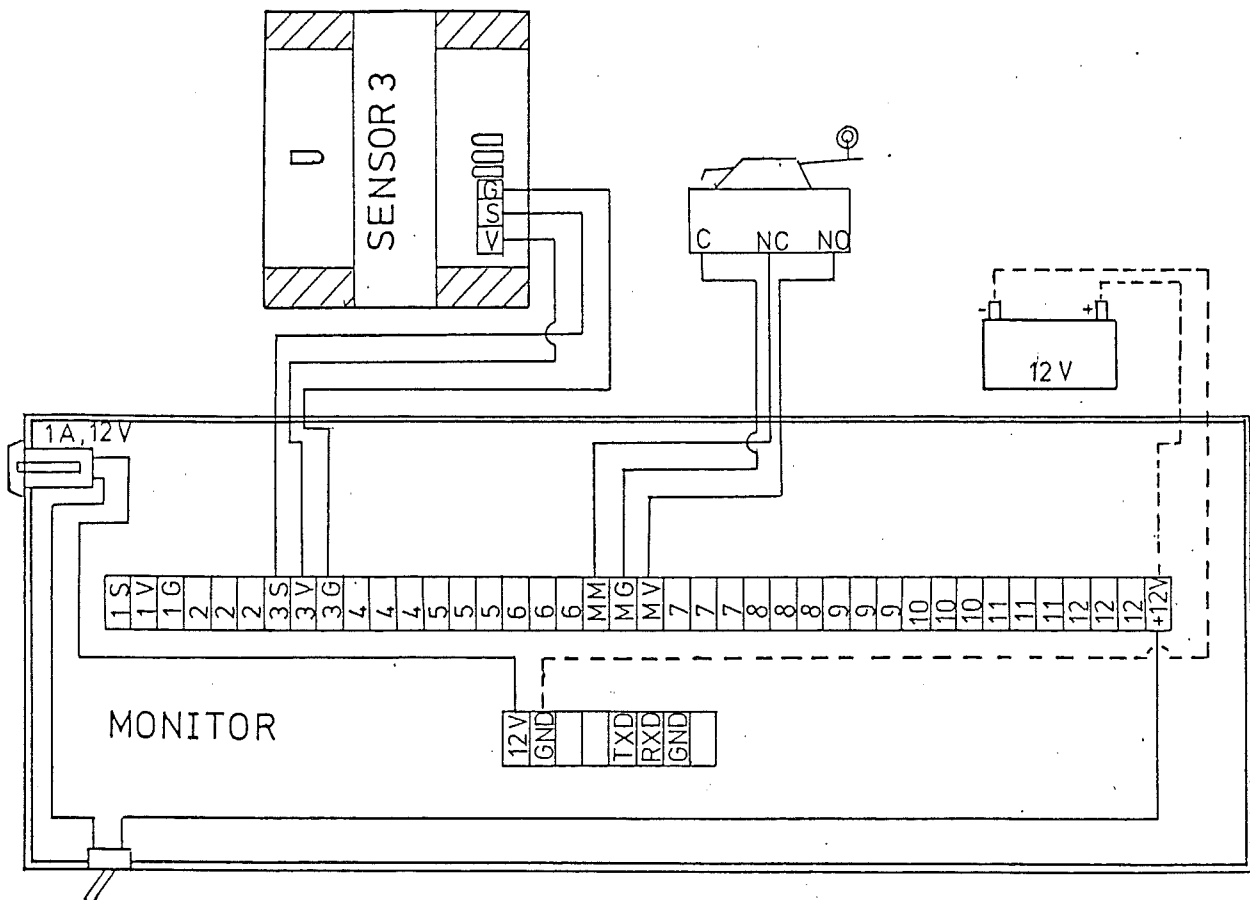
MG: (Microswitch ground)

MV: (Microswitch cut off contact)

The power supply of the battery is connected to the + 12 V screw connector on the large butt-strap.

The ground of the battery is connected to the GND-screw connector on the small butt-strap.

To protect the monitor against closing of the power supply there is a fuse (1 A, 12 V) on the side of the monitor box.



11. EXPLODED VIEW DRAWINGS

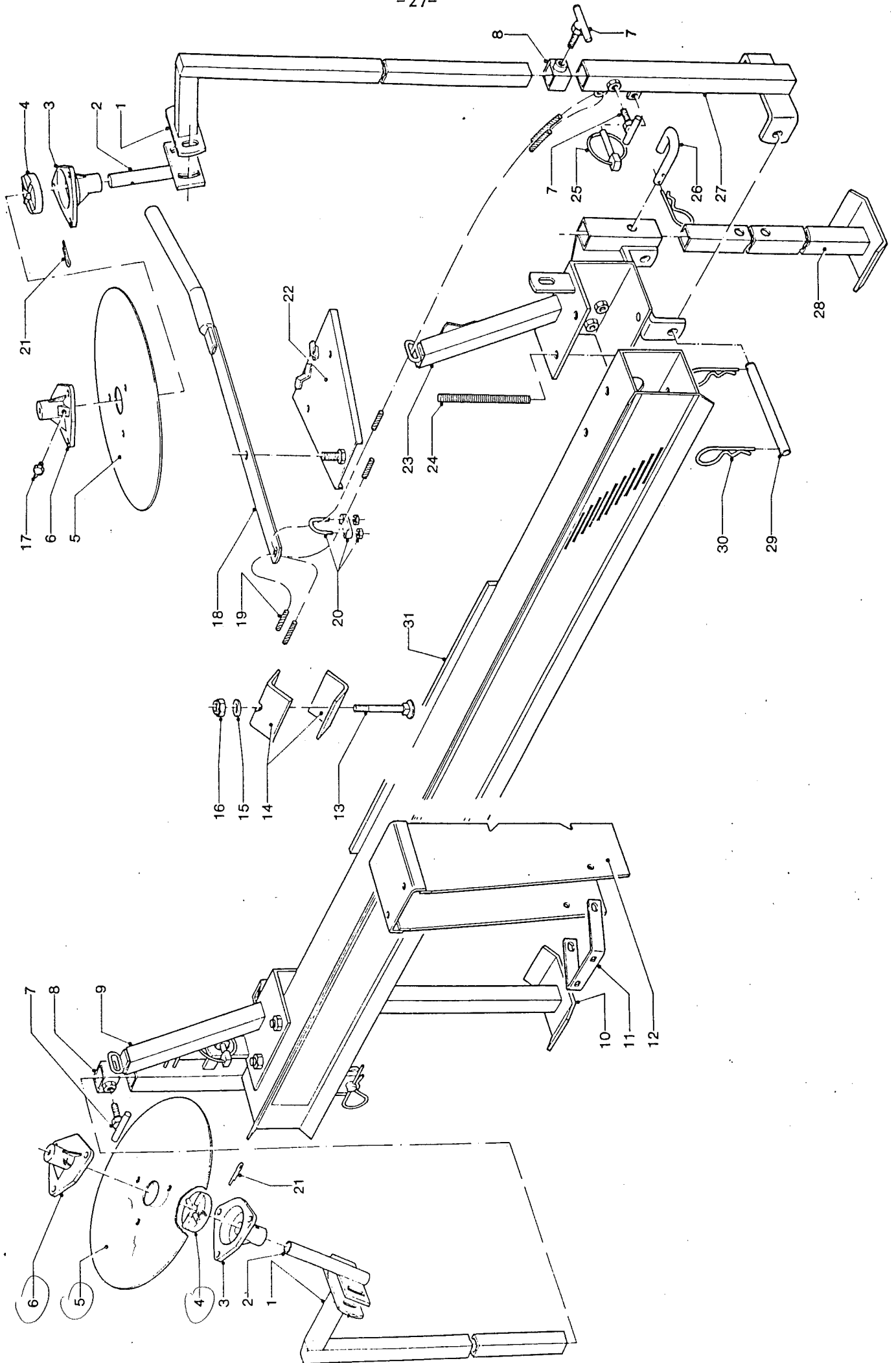
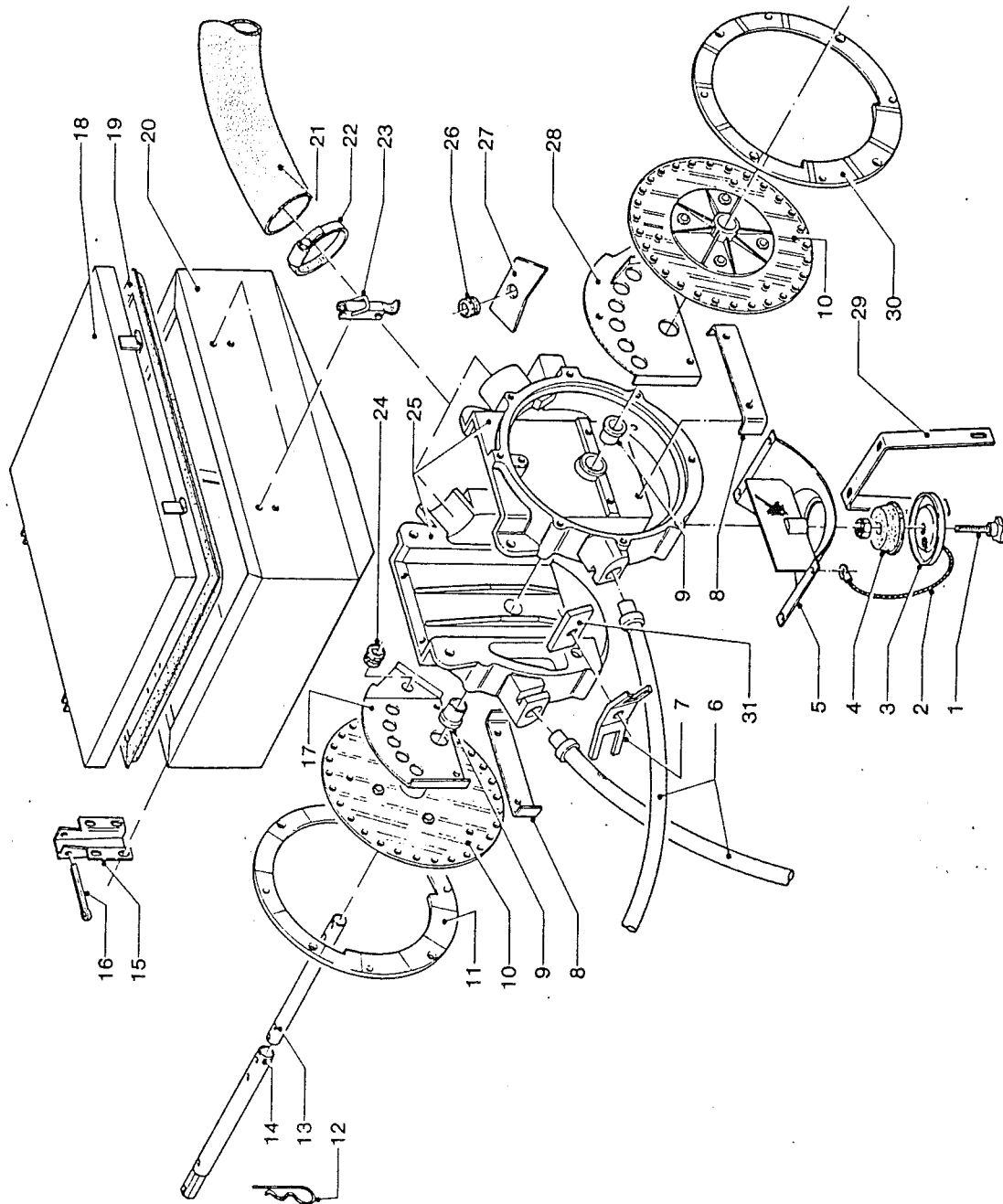


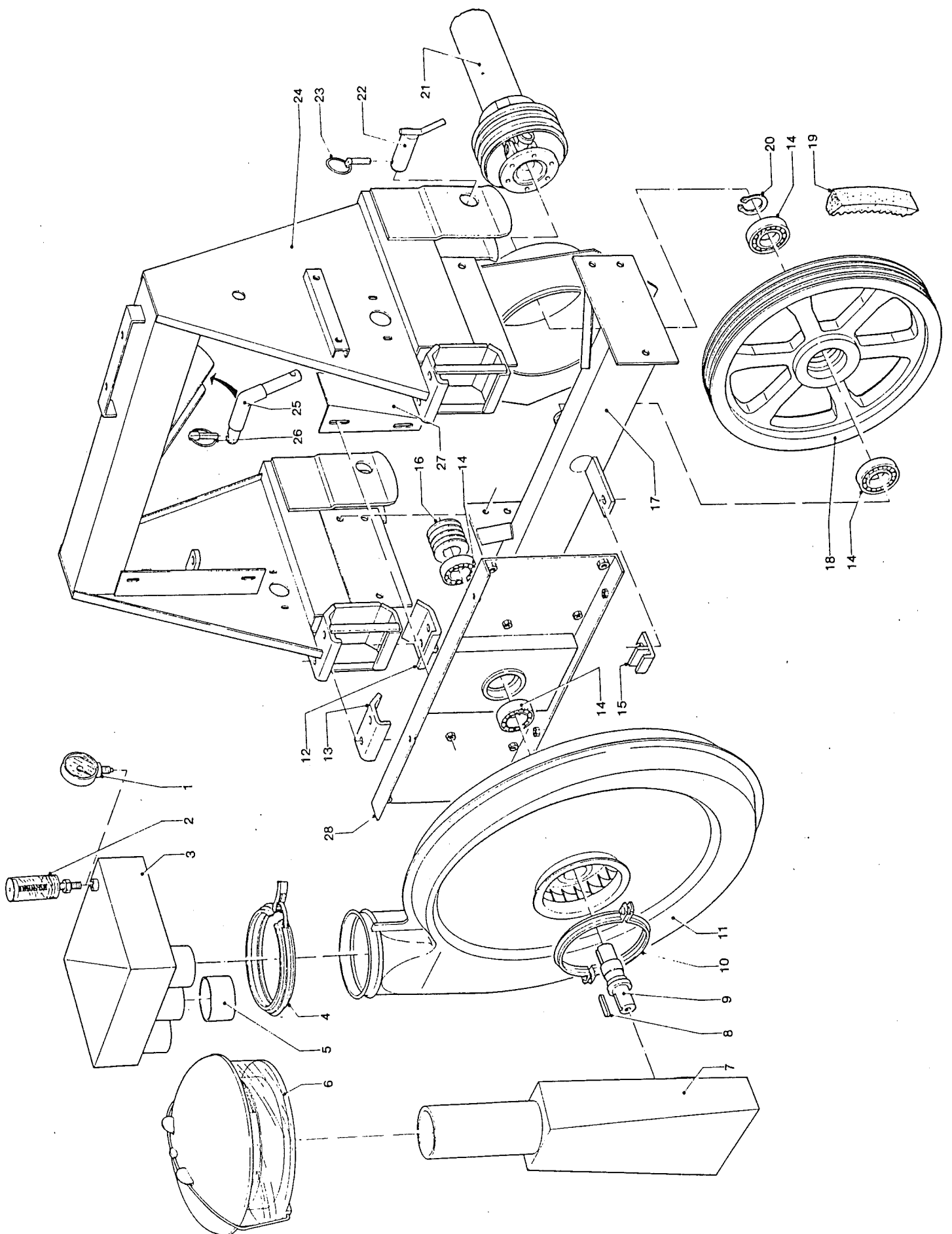
Fig.No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.059				
2	15.000.256				
3	15.000.718				
4	15.000.719				
5	15.000.716				
6	15.000.717				
7	15.000.238				
8	15.000.236				
9	15.000.047				
10	15.000.064				
11	15.000.325				
12	15.000.419				
13	00.323.125	M12 x 200			
14	01.017.017				
15		A13 DIN125			
16		M12 DIN982-8			
17		1/8"BSP/H1			
18	15.000.554				
19	15.000.721	ø 5 L=2,50 mtr			
20	15.000.722				
21	15.000.720	ø 6 x 35 DIN94			
22	15.000.552				
23	15.000.046				
24	15.000.045	M12 x 175			
25	00.333.014	ø 10			
26	15.000.239				
27	15.000.055				
28	15.000.064				
29	15.000.240				
30	00.333.011	ø 4			
31	15.000.525				



SEPARATION UNIT

PRECI-SEM SPARE PART LIST

Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.294				
2	15.000.670				
3	15.000.092				
4	15.000.310				
5	15.000.087				
6	15.000.531	Ø 22 x 2 - PA11W L = 1100 mm			
7	15.000.292				
8	15.000.084				
9	15.000.671	20/26 x 20 - 32 x 3			
10	15.000.517	30 x 2,2 - 213			
	15.000.518	36 x 4,2 - 215			
	15.000.578	45 x 4,8 - 210			
	15.000.579	30 x 2,0 - 215			
	15.000.580	30 x 2,5 - 214			
	15.000.581	36 x 5,2 - 210			
	15.000.582	30 x 2,0 - 214			
	15.000.583	30 x 2,8 - 214			
	15.000.584	36 x 4,2 - 213			
	15.000				
	15.000				
	15.000				
11	15.000.080	L (large seeds)			
11	15.000.591	L (small seeds)			
12	00.333.011				
13	15.000.102				
14	15.000.103				
15	15.000.199				
16	15.000.672	Ø 5 x 50 DIN94			
17	15.000.097	L			
18	15.000.201				
19	15.000.273				
20	15.000.196	40L			
20	15.000.410	57L			
21	15.000.673	Ø 70/m'			
22	15.000.674	Ø 68 - Ø 85			
23	15.000.675	75ZW			
24	15.000.676	Ø 15 mm			
25	15.000.677	15.000.077/078/671			
26	15.000.678	Ø 20 mm			
27	15.000.099				
28	15.000.096	R			
29	15.000.289				
30	15.000.079	R (large seeds)			
30	15.000.590	R (small seeds)			
31	15.000.076				



THREE POINTS HITCH

PRECISEM SPARE PART LIST

Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.565				
2	15.000.570				
3	15.000.446				
4	22.000.270	OK 6"			
5	15.000.535	70 mm			
6	15.000.592	PBH00-0822			
7	15.000.190				
8	15.000.667	8 x 7 x 30 ST60 DIN6885A			
9	15.000.100				
10	21.000.353	OK 8"			
11	21.081.021	TRL150			
12	01.017.252				
13	01.017.248				
14	15.000.668	6207 2RS			
15	15.000.251				
16	15.000.124	2SPZ56			
17	15.000.035				
18	15.000.123	2SPZ400			
19	15.000.526	XPZ1600LW			
20	15.000.669	Ø35 DIN471			
21	15.000.527	Walterscheid 164563			
22	15.000.270	CAT II			
23	00.333.014	10 mm			
24	15.000.023				
25	01.000.395	CAT I/II			
26	00.333.014	10 mm			
27	15.000.187				
28	15.000.039				

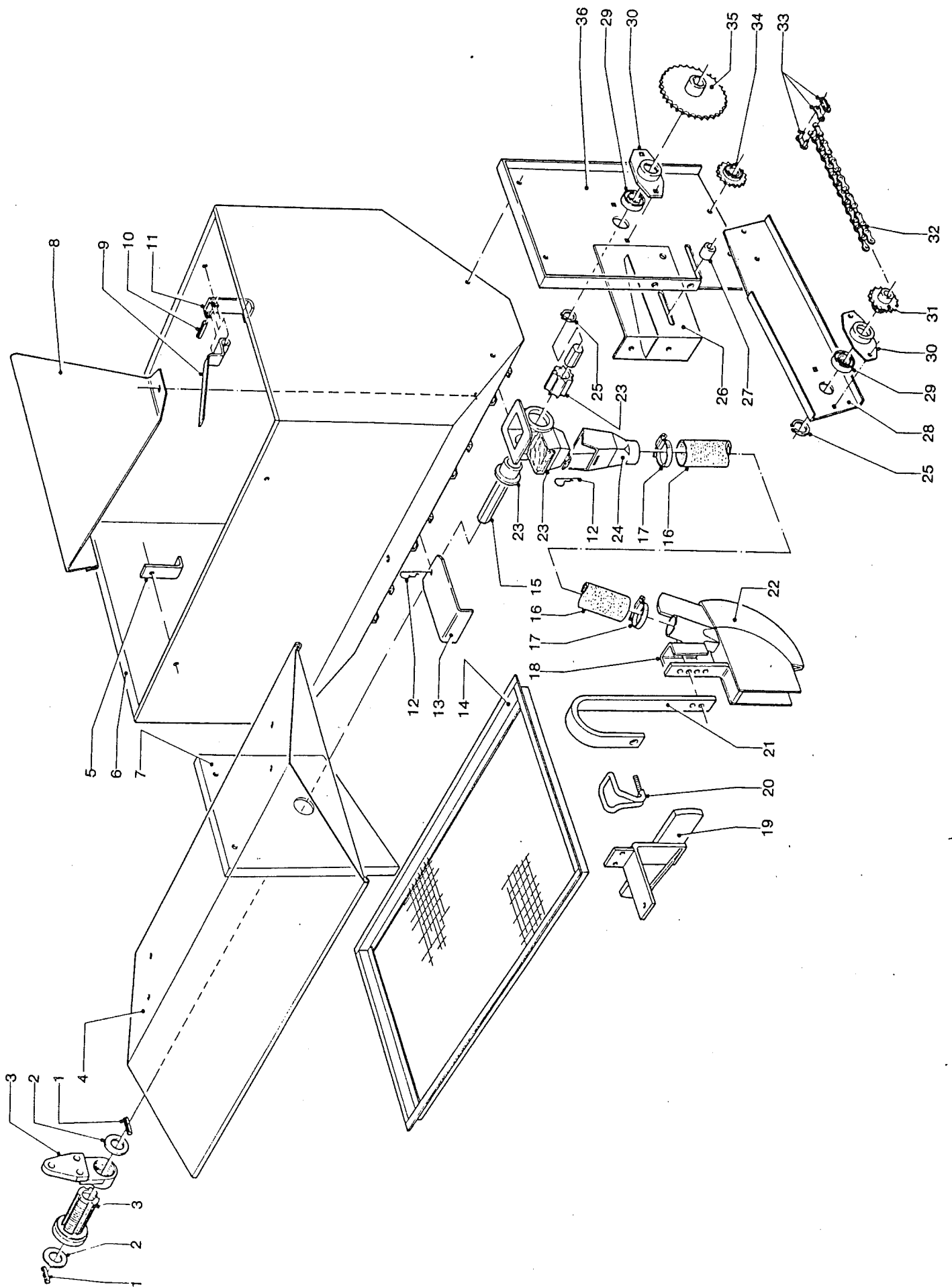
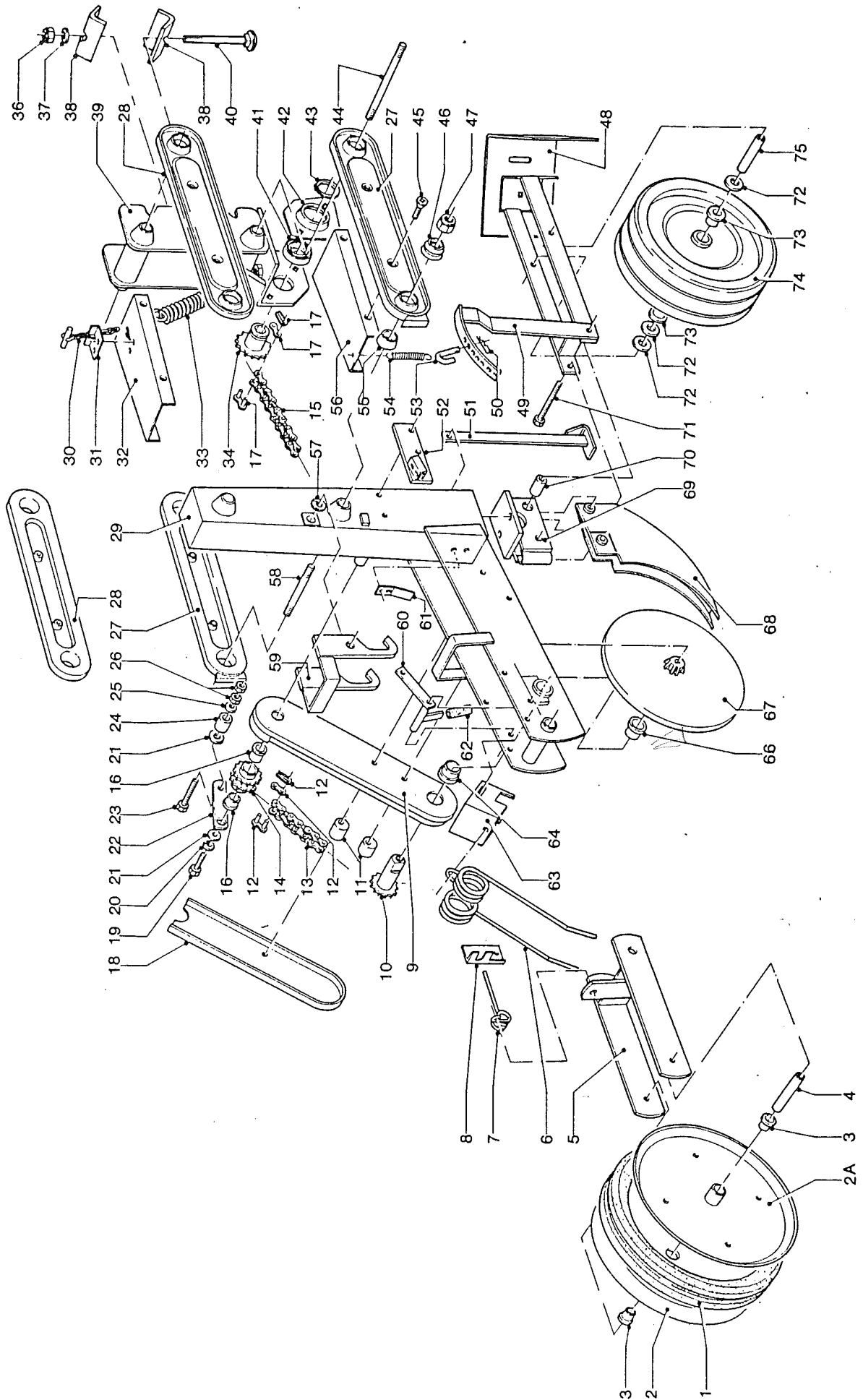


Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1		ø 5 x 25 DIN1481			
2	15.000.174	ø 30 x ø 20 x 2,5			
3	15.000.319				
4	15.000.162				
5	15.000.161				
6	15.000.150				
7	15.000.168				
8	15.000.154				
9	15.000.158				
10	15.000.724	ø 6 x 70 DIN			
11	15.000.159				
12	15.000.690	ø 2,5			
13	15.000.182				
14	15.000.423				
15	15.000.176				
16	15.000.533	ø 45 L=650 mm			
17	15.000.723	ø 44 - ø 56			
18	15.000.296				
19	15.000.405				
20	01.000.507				
21	15.000.288				
22	15.000.474				
23	15.000.318				
24	15.000.177				
25	15.000.679				
26	15.000.169				
27	15.000.144				
28	15.000.172				
29	15.000.680	6005 2RS			
30	15.000.175				
31	15.000.317				
32	15.000.725	3/8" DIN8187 L=1437 mm			
33	15.000.292	3/8" DIN8187			
34	15.000.336				
35	15.000.316				
36	15.000.165				



SOWING ELEMENT SMALL SEEDS

PRECI-SEM SPARE PART LIST

Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.698	Monoflex (Access)	68	15.000.186	Large seeds (15 mm)
2	15.000.408		69	15.000.356	
2a	15.000.407		70	15.000.298	
3	15.000.693	Ø 16/22 x 16 - 28 x 3	71		M10 x 110 DIN933-8,8
4	15.000.119	Ø 16 x 110	72		A21 DIN125
5	15.000.395	(Access)	73	15.000.699	Ø 20/26 x 20 - 35 x 4
6	15.000.268		74	15.000.532	Ø 230 x 80 ffw
7	15.000.399	(Access)	75	15.000.118	Ø 20 x 90
8	15.000.400	(Access)			
9	15.000.373				
10	15.000.215				
11	15.000.278				
12	15.000.692	3/8" DIN8187			
13	15.000.691	3/8" DIN8187 L=810 mm			
14	15.000.214				
15	15.000.694	3/8" DIN8187 L=772 mm			
16	15.000.693	Ø 16/22 x 16 - 28 x 3			
17	15.000.692	3/8" DIN8187			
18	15.000.376				
19		M8 x 16 DIN933-8,8			
20		M8 DIN7980			
21		B9,3 DIN6902 Ø 25 x 8,5 x 2			
22	15.000.371				
23		M8 x 50 DIN933-8,8			
24	15.000.144				
25		A8,4 DIN125			
26		M8 DIN982-8			
27	01.017.498				
28	01.017.497				
29	15.000.344				
30	15.000.367				
31	15.000.368				
32	15.000.365				
33	15.000.695	T33190			
34	15.000.212				
35					
36		M12 DIN982-8			
37		A13 DIN125			
38	01.017.017				
39	15.000.340				
40	00.323.125	M12 x 200			
41	15.000.680	6005 2RS			
42	15.000.175				
43	15.000.679	Ø 25 DIN471			
44	15.000.540	M10 x 190			
45	00.321.023	M8 x 16 DIN965.8,8			
46	01.017.543				
47		M10 DIN982-8			
48	15.000.392				
49	15.000.386				
50	15.000.690	Ø 2,5 mm			
51	15.000.402				
52	15.000.245				
53	15.000.269	Ø 8 mm			
54	15.000.696	T32030			
55	01.017.502				
56	15.000.277				
57	15.000.697	M12 DIN137			
58	01.017.539	M10 x 160			
59	15.000.363				
60	15.000.377				
61	15.000.299				
62	15.000.379				
63	15.000.267				
64	15.000.671	Ø 20/26 x 20 - 32 x 3			
65					
66	15.000.671	Ø 20/26 x 20 - 32 x 3			
67	15.000.091	Ø 280 x 12 mm (small seeds)			
67	15.000.085	Ø 280 x 16 mm (large seeds)			
68	15.000.185	Small seeds (7 mm)			

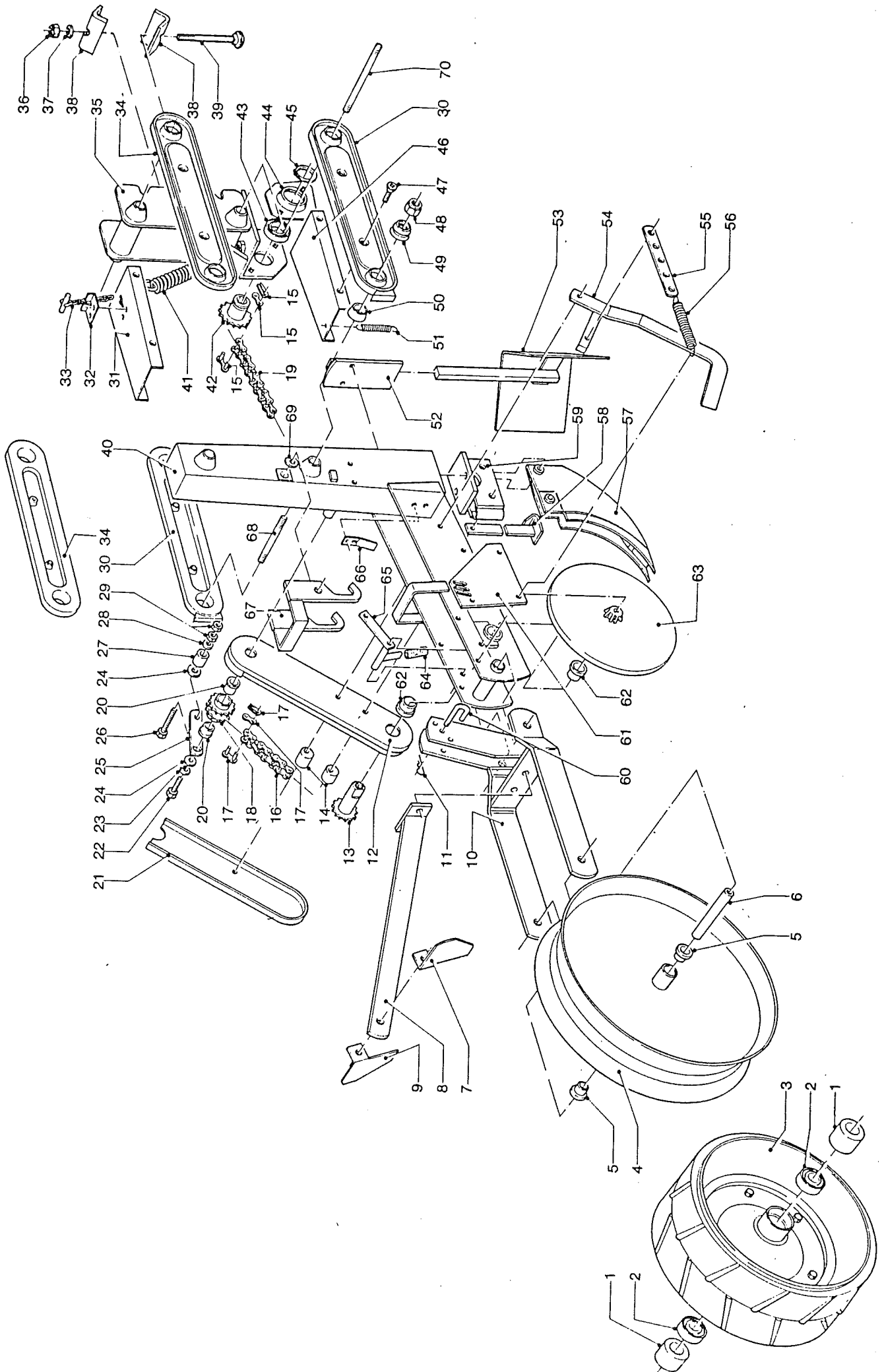


Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.126	ø 28 x 3,5 x 26,5	61	15.000.266	
1	15.000.714	ø 28 x 3,5 x 38	62	15.000.671	ø 20/26 x 20 - 32 x 3
2	15.000.715	6204 2RS	63	15.000.085	ø 280 x 16 mm (large seeds)
3	15.000.537	ø 370 x 165 (Access)	63	15.000.091	ø 280 x 12 mm (small seeds)
3	15.000.681	ø 500 x 175 (Access)	64	15.000.379	
4	15.000.441		65	15.000.377	
5	15.000.671	ø 20/26 x 20 - 32 x 3	66	15.000.299	
6	15.000.120	ø 20 x 175	67	15.000.363	
6	15.000.686	ø 20 x 200 (Access)	68	01.017.539	M10 x 160
7	15.000.264		69	15.000.697	M12 DIN137
8	15.000.261		70	01.017.540	M10 x 190
9	15.000.265				
10	15.000.452				
10	15.000.687	for ffw 500 x 175 (Access)			
11	15.000.690	ø 2,5			
12	15.000.373				
13	15.000.215				
14	15.000.278				
15	15.000.692	3/8" DIN8187			
16	15.000.691	3/8" DIN8187 L=810			
17	15.000.692	3/8" DIN8187			
18	15.000.214				
19	15.000.694	3/8" DIN8187 L=772			
20	15.000.693	ø 16/22 x 16 - 28 x 3			
21	15.000.376				
22		M8 x 16 DIN933-8,8			
23		M8 DIN7980			
24		B9,3 DIN6902 ø 25 x 8,5 x 2			
25	15.000.371				
26		M8 x 50 DIN933-8,8			
27	15.000.144				
28		A8,4 DIN125			
29		M8 DIN982-8			
30	01.017.498				
31	15.000.365				
32	15.000.368				
33	15.000.367				
34	01.017.497				
35	15.000.340				
36		M12 DIN982-8			
37		A13 DIN125			
38	01.017.017				
39	00.323.125	M12 x 200			
40	15.000.344				
41	15.000.695	T33190			
42	15.000.212				
43	15.000.680	6005 2RS			
44	15.000.175				
45	15.000.679	ø 25 DIN471			
46	15.000.277				
47	00.321.023	M8 x 16 DIN965-8,8			
48		M10 DIN982-8			
49	01.017.543				
50	01.017.502				
51	15.000.696	T32030			
52	15.000.416				
53	15.000.415				
54	15.000.430				
55	15.000.432				
56	15.000.696	T32030			
57	15.000.186	Large seeds (15 mm)			
57	15.000.185	Small seeds (7 mm)			
58	15.000.402				
59	15.000.356				
60	15.000.269	ø 8 mm			

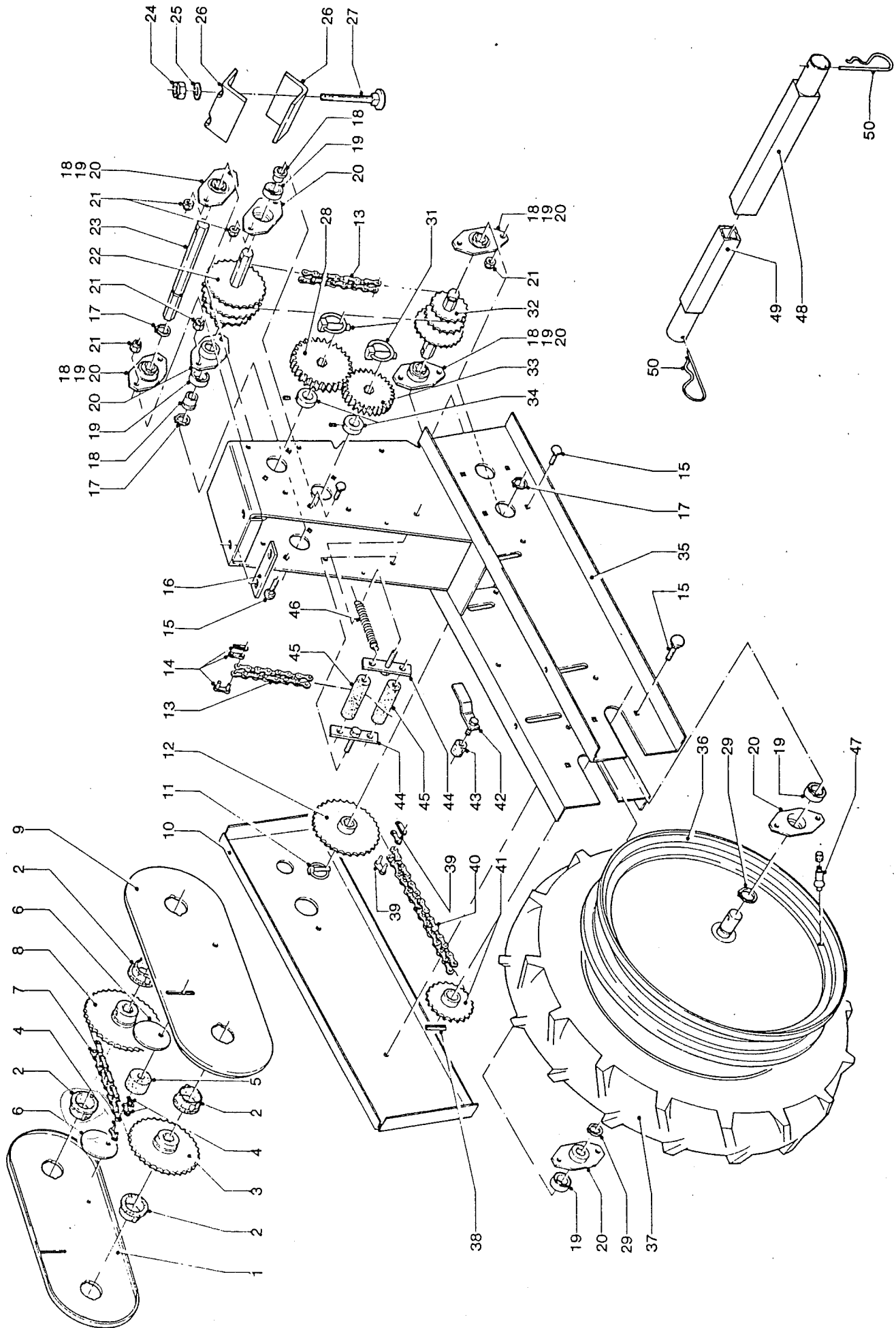
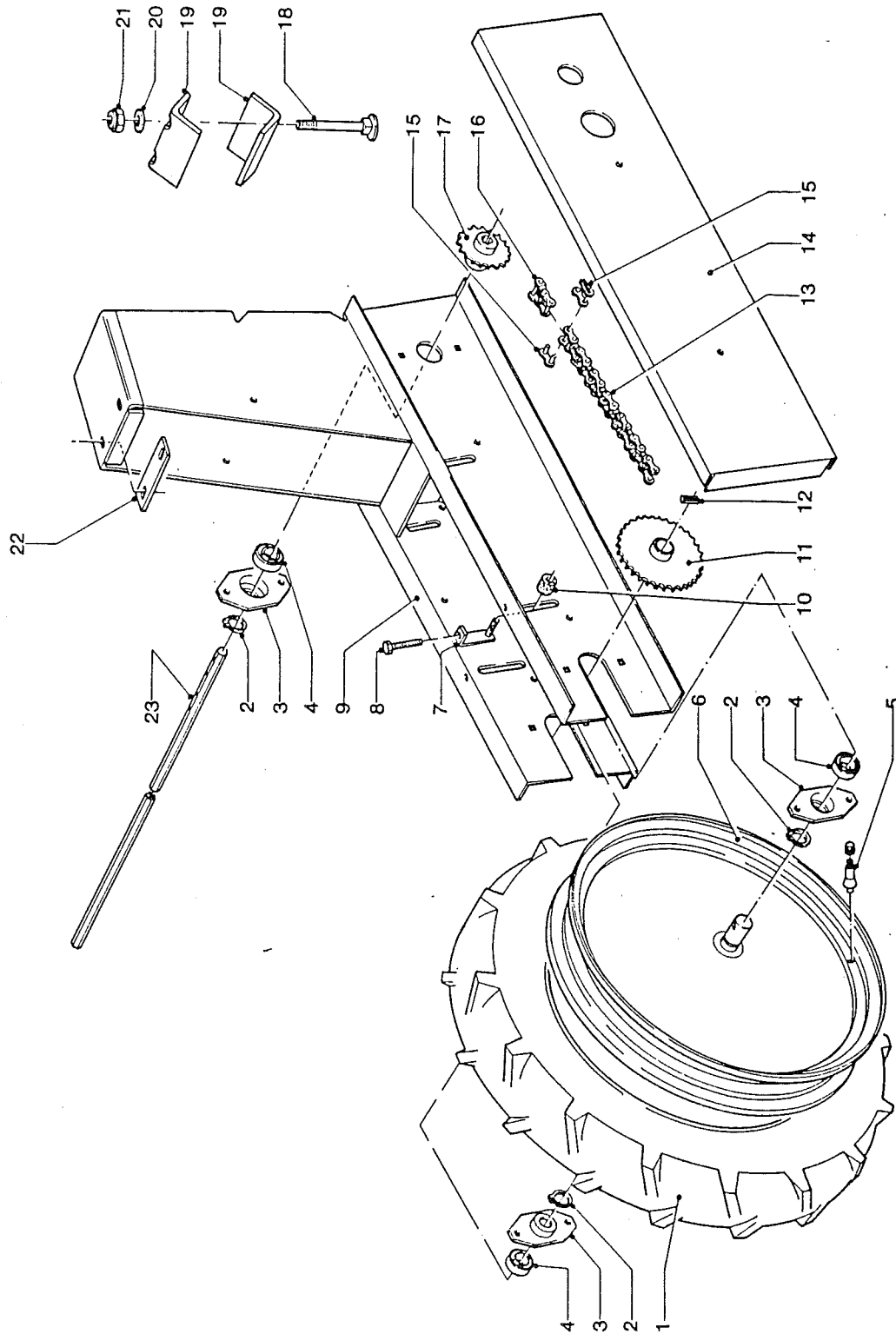


Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.380				
2	15.000.704				
3	15.000.229	3/8" - 35T			
4	15.000.692	3/8" DIN8187			
5	15.000.144				
6	15.000.384				
7	15.000.705	3/8" DIN8187 L=848 mm			
8	15.000.231	3/8" - 37T			
9	15.000.381				
10	15.000.422				
11	15.000.706	ø 4,5			
12	15.000.219	3/8" - 40T			
13	15.000.707	3/8" DIN8187 L=964 mm			
14	15.000.692	3/8" DIN8187			
15		M8 x 20 DIN603-8,8			
16	15.000.285				
17	15.000.708	ø 18 DIN471			
18	15.000.709	SLW17/25 x 15 - 28 x 2,5			
19	15.000.680	6005 2RS			
20	15.000.175				
21		M8 DIN982-8			
22	15.000.225	3/8" 28-33-33T			
23	15.000.106				
24		M12 DIN 982-8			
25		A13 DIN125			
26	15.000.136				
27	00.323.125	M12 x 200			
28	15.000.108	26T			
29	15.000.679	ø 25 DIN471			
30					
31	00.333.014	ø 10			
32	15.000.221	3/8" 27-21-20T			
33	15.000.109	29T			
34	15.000.710	ø 36 x ø 20 x 8			
35	15.000.130				
35	15.000.711	(Access 5,00 x 15)			
36	15.000.145	3,00D x 16			
36	15.000.702	4,00E x 15 (Access)			
37	15.000.528	AS FARMER 4,00 x 16			
37	15.000.700	BIBAGRIP M 5,00 x 15 (Access)			
38	15.000.682	ø 6 x 35 DIN1481			
39	15.000.692	3/8" DIN8187			
40	15.000.712	3/8" DIN8187 L=1268 mm			
41	15.000.217	3/8" - 25T			
41	15.000.713	3/8" - 21T			
41					
42	15.000.142				
43	15.000.144				
44	15.000.146				
45	15.000.148				
46	15.000.696	T32030			
47	15.000.529	TR413			
47	15.000.701	15DT9 (Access)			
48	15.000.067				
49	15.000.072				
50	00.333.011	ø 4			



WHEEL SUPPORT _ RIGHT HANDED

PRECISEM SPARE PART LIST

Fig. No.	Part No.	Notes	Fig. No.	Part No.	Notes
1	15.000.528	AS FARMER 4,00 x 16			
1	15.000.700	BIBAGRIP M 5,00 x 15 (Access)			
2	15.000.679	ø 25 DIN471			
3	15.000.175				
4	15.000.680	6005 2RS			
5	15.000.529	TR413			
5	15.000.701	15DT9 (Access)			
6	15.000.145	300D x 16			
6	15.000.702	400E x 15 (Access)			
7	15.000.283				
8		M6 x 70 DIN933-8,8			
9	15.000.140				
9	15.000.703	(Access 5,00 x 15)			
10	15.000.144				
11	15.000.208	1/2" - 32T			
12	15.000.682	ø 6 x 35 DIN1481			
13	15.000.683	1/2" DIN8187 L=1435 mm			
14	15.000.422				
15	15.000.684	1/2" DIN8187			
16	15.000.685	1/2" DIN8187			
17	15.000.210	1/2" - 17T			
18	00.323.125	M12 x 200			
19	15.000.136				
20		A13 - DIN125			
21		M12 DIN982-8			
22	15.000.285				
23	15.000.176				