

Spearhead

450-9S

Operator's & Parts Manual

*Fifth edition
November 1999*

***Important** - The information contained in this manual is correct at the time of publication. However, in the course of constant development, changes in specification are inevitable. Should you find the information given in this book different to the machine relates to please contact the "After Sales Department" for advise.*

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Safety

- Before use, always check that all guards are properly fitted.
- Check there are no damaged or lost parts. Particular attention should be given to the blades to ensure they are not damaged, cracked or missing. Never operate with broken or missing blades.
- Check condition of tyres and that all wheel nuts are tight daily. Particular attention must be made to wheels before road transportation.
- When removing wheels never undo outer rim bolts, only remove the five larger nuts. Ensure the maintenance notes are read before attempting any maintenance.
- Never operate the machine with other people present as it is possible for debris, even large stones to be discharged from the front and rear of the machine. Keep all tractor windows closed.
- Do not allow children to play on or around the machine at any time.
- Never attempt any maintenance or adjustment without first disengaging the p.t.o. and apply the handbrake, lowering the machine to the ground and stopping the tractor engine. Before leaving the tractor at any time always be sure the p.t.o. is disengaged and the rotors have stopped spinning.
- Before folding the mower wings into transport position, ensure all blades have stopped spinning. Never engage the p.t.o. with wings folded. Once folded, always fit locking pins before leaving site of work. Also, beware of the free-swinging blades over-centring and falling when wings are folded.
- Never stop the engine with the p.t.o. engaged.
- Ensure that all warning labels are always visible and that they are not damaged, defaced or missing.
- Never attempt to use the machine for any purpose other than that it was designed for.

Important

The purchaser should ensure that this manual is handed to the operator before using the machine for the first time and should be satisfied that the operator fully understands the contents of this manual before being allowed to proceed. If the machine is resold the Operators Manual must be given to the new owner.

The operator must be a skilled and a proficient tractor driver with experience in operating grass cutting machinery. If there is any doubt in the operation for safety concerning any aspect of this machine do not hesitate to contact your dealer for advice.

Fill in the details below, you will find it useful to refer to when ordering spare parts.

Serial No.

Date of Delivery

Dealer's Address

.....

.....

.....

Telephone No.

Spearhead Machinery Limited

*Pershore Trading Estate, Pershore,
Worcestershire WR10 2DD*

Tel: 01386 556748 Fax: 01386 561398

e-mail: enquiries@spearhead.uk.com

visit our web site: www.spearhead.uk.com

Introduction

The 450-9S is a very robust high capacity rotary cutter that is easy to operate and maintain. To ensure trouble-free operation this manual should be carefully studied.

Safety First

Do not start the machine until you fully understand the operation and safety precaution requirements. Always ensure the operators are proficient with the operation of this type of machine.

Tractor requirements

- Spearhead recommend 85hp upwards.
- Fixed clevis drawbar.
- Minimum tractor weight 3000kg.
- P.t.o. must be independent live drive is enable continuous P.t.o. drive even when tractor clutch is pressed down.
- 2 external oil supplies, both single, acting one with a detent float position.

Attaching to the tractor

It is advisable to remove the tractor rear link arms. However, if this is too inconvenient, at least check the link arms are high enough not to damage the p.t.o. shaft when turning.

Before coupling to the tractor, it is important to check that the tractor draw bar is out at its longest setting approx 400mm from the tractor P.t.o. shaft, which will give the tightest turning circle without risk of bottoming the p.t.o. shaft. Do not attach the machine to the pick up hitch or to the short drawbar as this will result in serious damage to the machine.

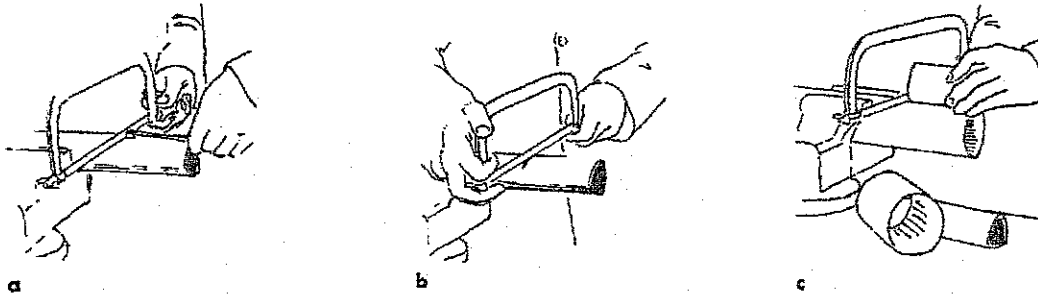


Fig. 1 Shortening the p.t.o. drive shaft

- a** Check shaft tube surplus length.
- b** Cut surplus length from shaft tubes. File sharp edges and remove burrs.
- c** Shorten shield tubes to the same length. Grease inner shaft tube and install shield.

Before fitting the p.t.o. for the first time, it may be necessary to adjust the length. There should be maximum engagement of the sliding tubes without bottoming at the shortest operation position. To check, first connect the mower to the tractor. Pull the p.t.o. shaft apart and connect to the tractor p.t.o. output shaft and the gearbox input shaft. Hold the half shafts next to each other in the shortest working position. If necessary, shorten the inner and outer guard tubes equally (Fig. 1). Shorten the inner and outer sliding profiles by the same length as the guard tubes. File all sharp edges and remove burrs. Grease sliding profiles.

To fit the p.t.o., first clean and grease. Press pins on the yoke and simultaneously push the p.t.o. drive shaft onto p.t.o. shaft of the tractor until pins engage.

The p.t.o. shaft is fitted with a non-rotating safety guard. It should be secured to the machine and tractor with the two retaining chains provided.

Connect the two hydraulics, one to each separate single acting service, each with a dump facility. This is particularly important for the spool valve that operates the wings as, when in work, the wings must be able to follow the ground contours.

Setting up and adjustment

Once coupled to the tractor, check the mower is level from the front to the rear of the machine. This is important to ensure each rotor will cut at the same height (Fig. 2). Because of the variation in tractor draw bars' height, the 450-9S parallel lifting linkage has adjustable tie bars (Fig 3, a).

Lengthening the tie-bars will lower the front of the mower; shortening the tie-bars will raise the front of the mower. This adjustment can be made easier by lowering the machine onto the stands, thereby taking the weight of the draw bar, carrying out the adjustment to the tie bar length, then raising the machine to check. Once satisfied the mower is level, raise the stands fully up. **Never operate with the stands down.**



Warning: When operating over uneven ground it is recommended to raise the front of the machine by adjusting the tie bars to prevent scalping or damage to the blades.

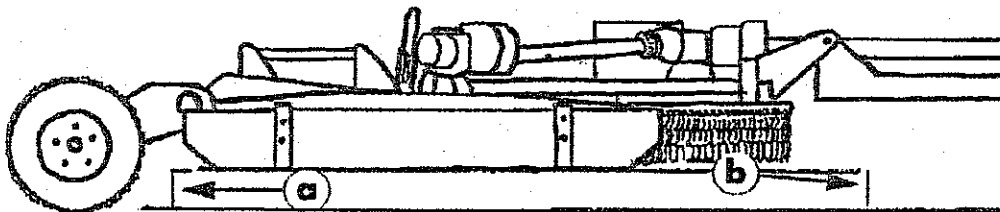


Fig. 2 Height adjustments
The height at **a** and **b** should be the same.

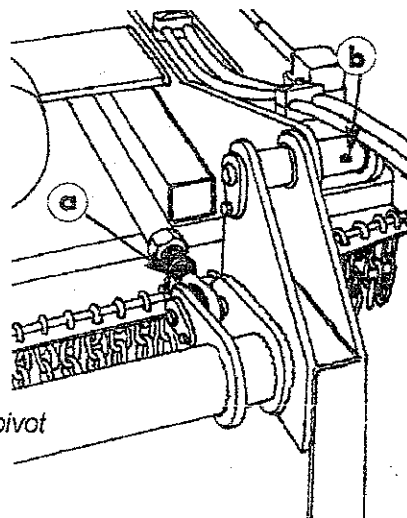
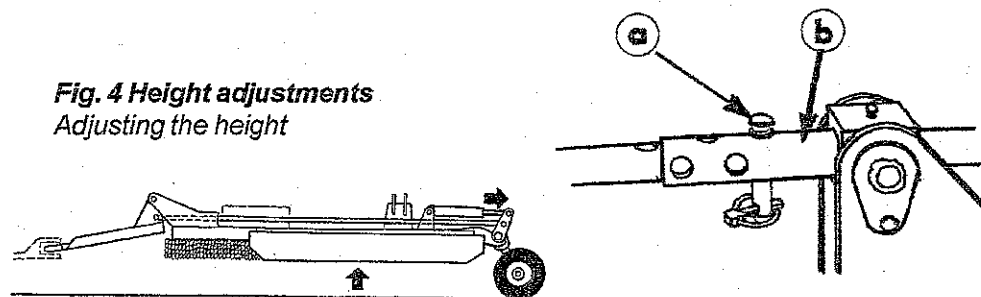


Fig. 3
a Tie bar
b Front draw bar pivot

Height

To alter the minimum height of cut; fully raise the machine, remove pin **a** (Fig. 4) slide sleeve **b** forward or backwards to raise and lower cutting height respectively, replace pin **a** through sleeve **b** and gently lower the machine. The sleeve **b** only controls the minimum cutting height, however the operator may raise and lower the machine by the hydraulic ram when the machine is in operation.



Skids

The two side skids are adjustable, but generally are left set 1" below the blade cutting height. However, if operating on rough terrain, it is advisable to set the skids to carry some of the weight of the wings as this will reduce bounce and stress. To achieve a very short finish, it is desirable to adjust the skids so that they are in contact with the ground when at height of cut. The skids should take some of the wing weight, so as to prevent scalping.

Unfolding the wings if the machine is in the transport position, first pressurize hydraulic rams before releasing locking latches, lower both wings by releasing hydraulic pressure, leaving tractor spool in float position.

Operation

Once ready for work, raise the mower and slowly engage the p.t.o. with the tractor engine at low revs to prevent shock damage to the machine. Slowly increase the engine revs to achieve the recommended p.t.o. speed of 540/1000r.p.m.. If at any time serious vibration occurs, **stop the engine immediately and check the blades, following all safety precautions.** Select a sensible forward speed bearing in mind the density of growth, the terrain, and the available horsepower.

The quality of finish is determined by the forward speed, i.e. a slow speed will produce a high quality of cut, where as faster forward speeds are used when high output is first priority.

When in work, always ensure the hydraulic spool valve that operates the folding of the wings is in dump position to enable the wings to freely follow all contours of ground (Fig. 5).

When turning, it is possible to turn in a tight circle as the 450-9S is fitted with a constant velocity joint on p.t.o. shaft. However take care not to run the rear tractor wheel against the mower draw bar as this will result in serious damage to the tractor, the mower and, in particular, the p.t.o. shaft.

The constant velocity joint on the input p.t.o. shaft, allows the p.t.o. to be left in gear whilst turning out of work, e.g. on the headlands. It is important not to turn sharply when the machine is in work as this will overstrain and shorten the life of the constant velocity joint.

When operating in confined areas it is possible to cut going backwards, but it is advisable to slightly raise the machine, particularly if in scrub, where there is the risk of hitting hidden solid obstacles obscured by dense undergrowth.

Always exercise particular care when operating over uneven ground surfaces. Do not allow the blades and blade holders to frequently hit the ground.

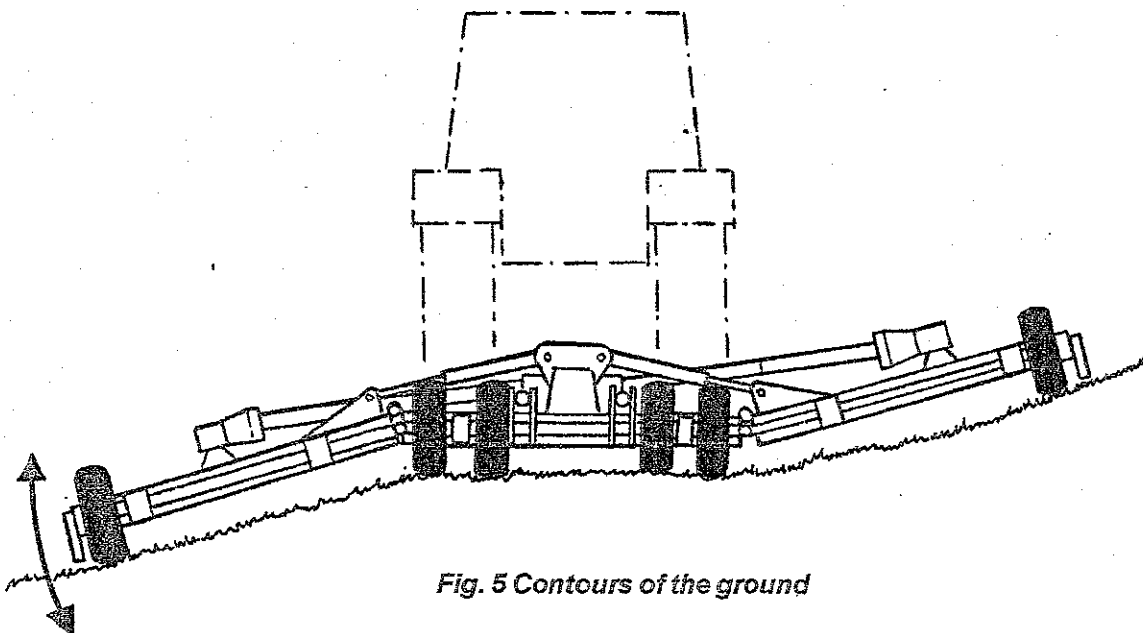


Fig. 5 Contours of the ground

Transportation

First disengage the p.t.o. drive and 3/4 raise the machine, fold the wings to fully upright and secure with hooked latches (Fig. 5). Never transport along public highways with the wings only supported by the hydraulics.

Please observe Public Highway Regulations, concerning the towing of implements, and securely attach a registration and lighting board.



Warning: *Avoid transporting machine at high speed over rough ground.*

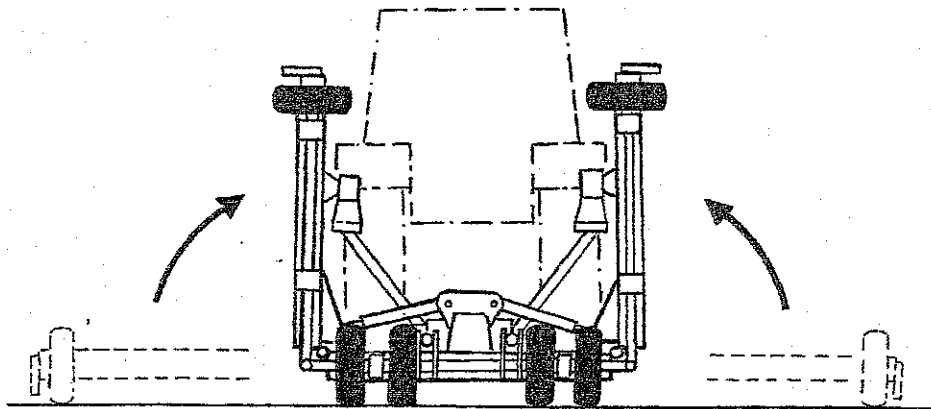
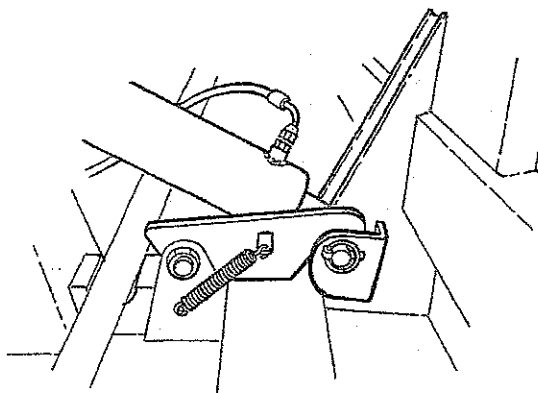


Fig. 6 Hitching latch & Transportation position



Machine protection

To prevent gearbox damage all rotors are protected by slip clutches fitted to each of the three drive shafts. When cutting in extreme conditions where stumps, rocks and other such solid objects are likely to be found it is recommended that the operator reduces the engine revs to allow the blades to pivot more easily when striking solid objects, and precede with caution.

The clutch settings should not be altered without reference to Service and Maintenance. Never over-tighten the pressure springs on the slip clutches (Fig. 7b) this could result in severe damage to the gearbox and drive lines, as well as infringing to the warranty.

If the machine has been laid up for any length of time, there is a risk of the clutch plates rusting and seizing together. Never operate the machine in this condition as there will be no protection to the drive line and gearboxes against shock loading. To free the clutch plates first slacken all pressure spring bolts (Fig. 7) and run up the machine for a short period, deliberately try to cause the clutch to slip. Finally re-tighten the tension spring bolts to their original length, taking great care not to over-tighten. Alternatively refer to section after storage.

If in any doubt, consult Spearhead's Service Department or your local Spearhead Dealer for further advise.

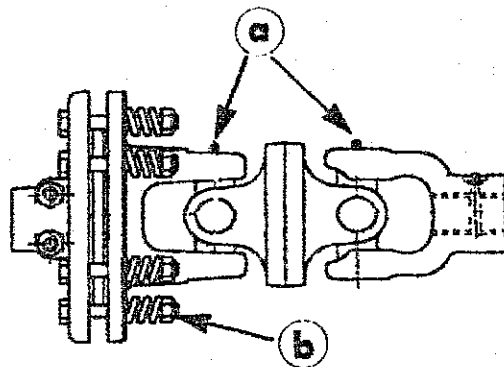


Fig. 7 Slip clutch

- a** Grease point on the centre coupling c/w slip clutch
- b** Pressure springs on the slip clutches

Servicing & Maintenance



Warning: *Never carry out any servicing or maintenance work without first disengaging the p.t.o. and then stopping the tractor engine before leaving the seat.*



Important: *On delivery of your machine check that the Dealer has completed the p.d.i. form, ensure the warranty registration form in this manual is completed and returned.*

Safety first

- Never leave the tractor seat without first disengaging the p.t.o. and stopping the engine.
- Ensure all rotating objects have stopped turning.
- Never attempt any repairs, maintenance, service or any other checks with the machine carried on the tractor hydraulics.
- Always fully lower to the ground, or securely prop the machine on substantial servicing stands.
- Always replace all guards and retaining chains after servicing/ maintenance completed.

Servicing and Maintenance

It is imperative that the following checks are carried out in order not to invalidate your warranty, these are carried out ***before the first operation, after the first hour, then after 4 hours.*** These checks are:

- Wheel nuts and tyre pressure,
- Gearbox bolts, Inc.. the splitter box,
- Oils in all the 4 gearboxes,
- Blade bolts are fully tightened and in particular the 3 castle headed nuts on the 3 blade rotors,

- Retaining bolts on the drive shafts,
- Grease all points including drive shaft tubes.
- After the first 50 hours drain and replace the gearbox oil. Replace with EP90 gear oil.

Daily

- Grease all grease points, including rear axle pivot points (Fig. 8a), wheel arms (Fig. 8b), wheel arms (Fig. 8c), and front draw bar pivot (Fig. 1b).
- Check bolts are tight on all gearboxes.
- Check condition of blades and blade bushes ensure all retaining bolts are fully tight.
- Check wheel nuts are tight.
- Check tyre pressures - 50 p.s.i.
- Check gearbox oil, replenish with EP90 gear oil as necessary to the correct level line on the dip sticks, provided with each gearbox.

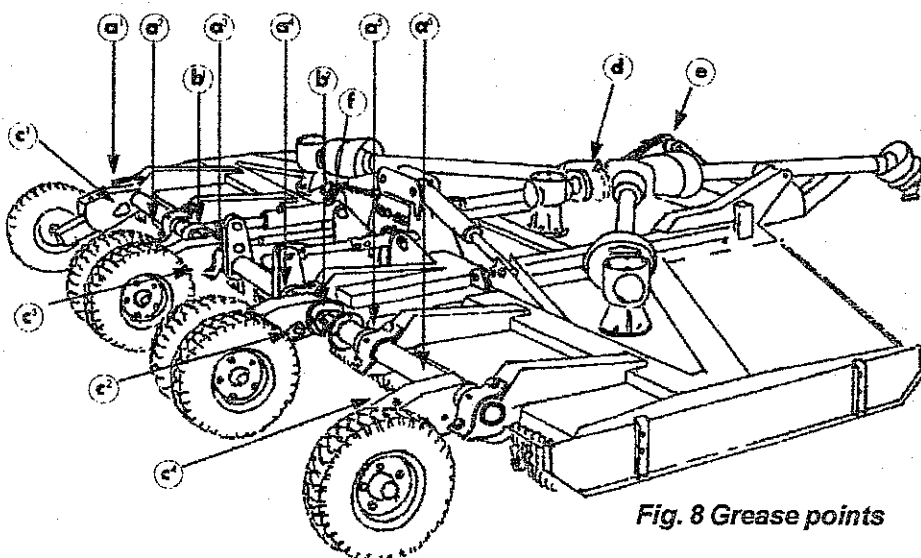


Fig. 8 Grease points

- a** Rear axle pivot points; grease points (6 off)
- b** Rear axle hinge joint grease points (2 off)
- c** Wheel arm grease points (4 off)
- d** Centre coupling c/w slip clutch (2off)
- e** Front draw bar grease point
- f** Height adjustment grease point

Every 8 hours

- Dismantle and clean and clean the main input p.t.o. shafts sliding surfaces and regrease; failure to do this will result in serious damage to the input gearbox.
- Grease all universal joints, (Fig. 9) paying particular attention to the constant velocity joint (Fig. 9c). If under-greased this constant velocity joint will soon fail.
- Grease the wing drive shaft tubes, (note the hole in the plastic tubing for access).

Lubricate the retaining collar on all the drive shaft guards (Fig. 9a).

Every 20 hours

- Grease p.t.o. inner tube and push pins (Fig. 9c)

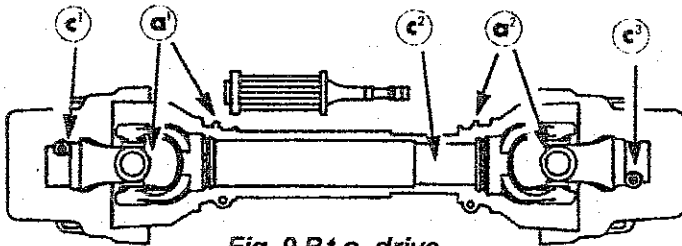
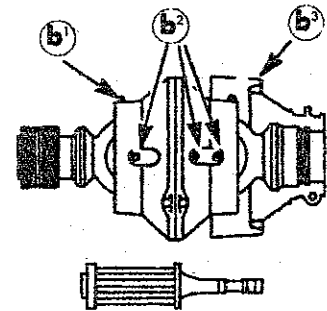


Fig. 9 P.t.o. drive

P.t.o. drive and constant velocity joint grease.

**Regularly**

- Check there is no wrapping of string, plastic, grass or other debris between rotor boss and gearbox oil seal.
- Inspect gearbox seals for leaks.
- Clear grass and other debris from the deck.

- Regularly check the rotor boss retaining castle nut for tightness (part no. 5771409). First remove the split pin, select the correct size socket in 3/4" drive and fully tighten the nut. When replacing the split pin, do not slacken the nut to align the hole, always tighten. Failure to regularly check this nut will result in serious wear to hub, which is expensive to repair.
- ***It is most important that all gearbox bolts are regularly checked to be very tight. When the machine is new there will be a 'bedding in' period where very frequent checking is important.***

Blades

Caution! When carrying out maintenance work on or near the blades be careful of free-swinging blades over-centring and falling. It is recommended that protective clothing including hard hat and goggles are worn.

The blades can be re-sharpened by grinding the cutting edges, care must be taken that the blades are of the same weight and length after grinding. Do not overheat when grinding as this will affect the hardness of the blades. All the blades are free swinging and swivel on hardened steel bushes which are easily replaceable. When replacing blades, it is important that blades are replaced in sets, in order to retain balance of the rotor. Bushes must be replaced when new blades are to be fitted.

If the blades are showing any signs of severe wear, damage or cracking, they must be replaced immediately. Never attempt to weld the blades, as this will make them very brittle thus extremely dangerous. Do not take risks with the cutting blades - if in doubt, replace.

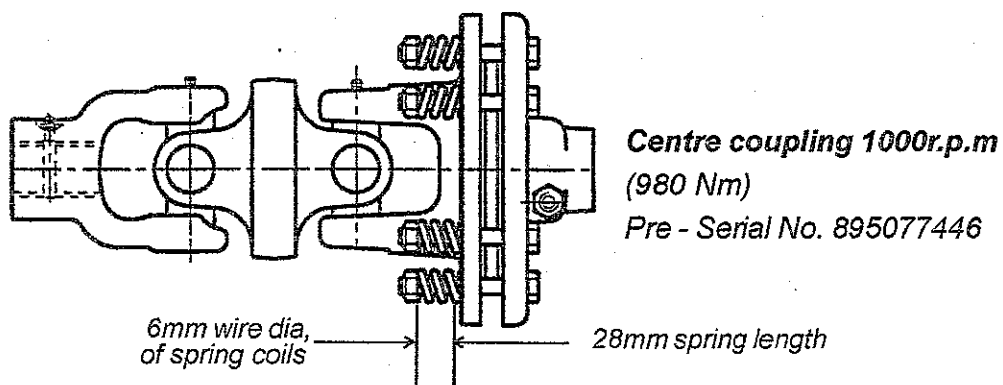
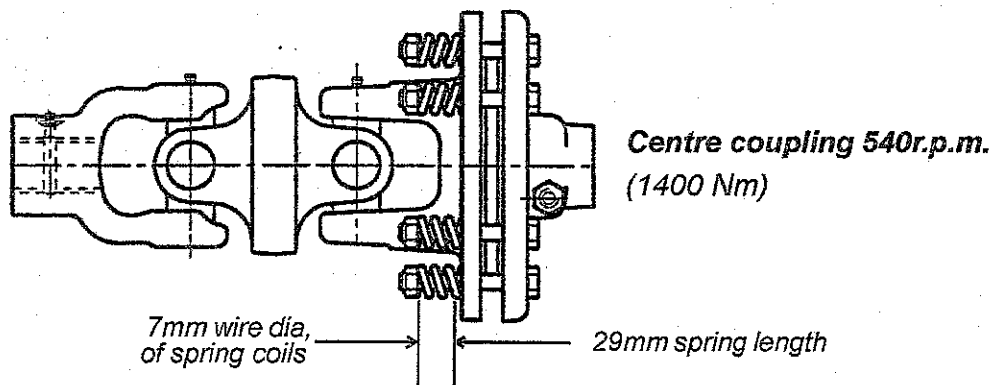
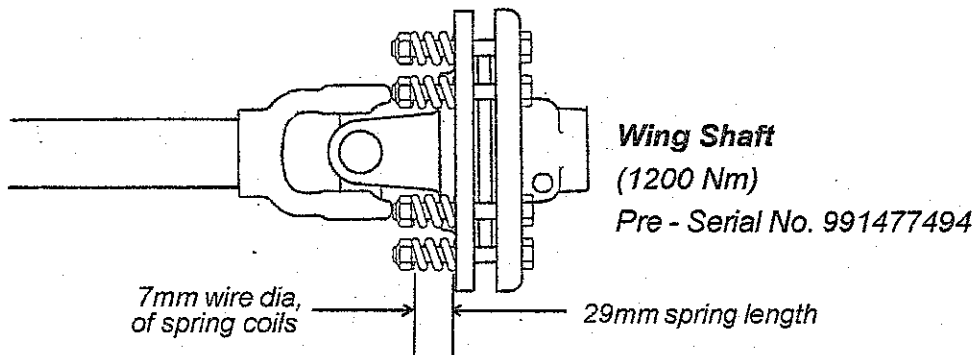


Warning: *The slip clutch is there to protect the gearbox, if the blades strike a large obstacle they may get damaged or break avoid these conditions.*

Slip clutch settings

The following settings are compatible to:
Wing Shaft Pre - Serial No. 991477494
Centre section Pre - Serial No. 895077446

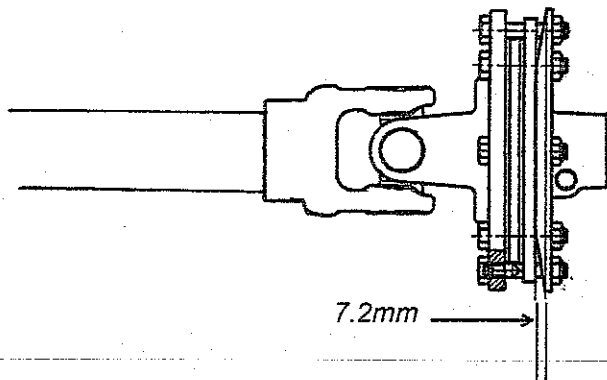
Position	Spring length	Spring type	Torque setting
Wing 540 & 1000 r.p.m.	29 mm	7 \emptyset mm coils	1200 Nm
Centre 540 r.p.m.	29 mm	7 \emptyset mm coils	1400 Nm
Centre 1000 r.p.m.	29 mm	6 \emptyset mm coils	980 Nm



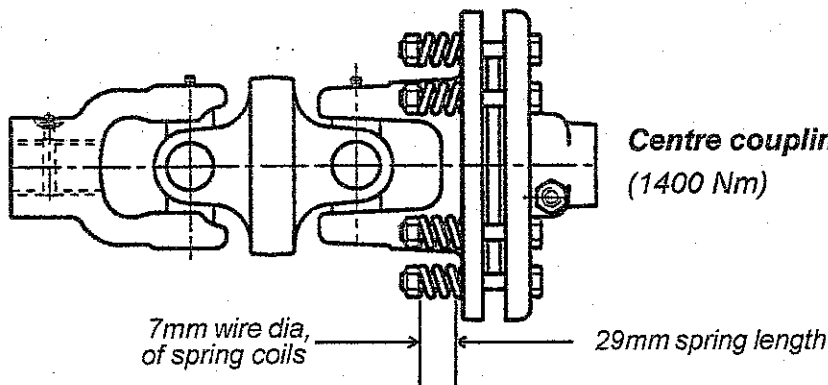
Slip clutch settings

The following settings are compatible to:
Wing Shaft Post - Serial No. 991477493
Centre section Pre - Serial No. 990177446

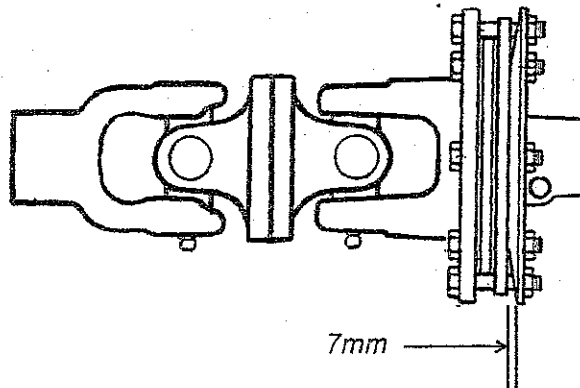
Position	Spring type	Gap setting	Torque setting
Wing 540 & 1000 r.p.m.	Diaphragm	7.2 mm	1200 Nm
Centre 1000 r.p.m.	Diaphragm	7 mm	1010 Nm



Wing Shaft
 (1200 Nm)
 Post - Serial No. 991477493



Centre coupling 540r.p.m.
 (1400 Nm)



Centre coupling 1000r.p.m.
 (1010 Nm)
 Pre - Serial No. 99177446

Skids

When operating on abrasive soils, particularly in stubbles and similar conditions with thin ground cover, excessive skid wear may be expected. To provide extra protection and to prolong life of the skids, special hard facing rods are available.

If working in wet and muddy conditions, ensure that mud thrown from tractor wheels is not allowed to build up between the deck and drive shafts as this could cause damage to the drive shafts and eventually put strain on to gearbox bearings.

Wheels



Warning: *Heavy duty industrial tyres have been fitted to 450-9S for convenience of tyre removal, the wheel rims are of the split rim type.*

When removing the wheels only remove the five larger hub nuts. **Never** undo the smaller outer nuts (which are painted red for danger) when removing the wheel.

The outer nuts must not be loosened until the valve has been removed and the inner tube is entirely deflated. **Then, and only then may the outer bolts can be loosened. Failure to observe these precautions could seriously injure and could even result in loss of life.** If in any doubt consult a tyre repair specialist or Spearhead's Service Department.

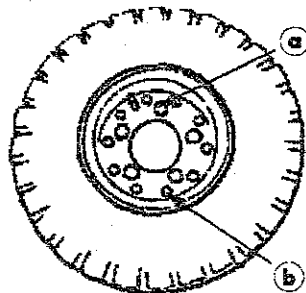


Fig. 10 Wheel

- a Hub nuts
- b outer nuts (painted red)

Storage

Before storing away, thoroughly wash the machine removing all traces of grass and dirt. Great care must be taken when washing with high pressure hoses, do not hold the water jet close to the paint work. Use steam cleaners with caution and be sure to remove all detergents to avoid any discoloration or damage to the paint work.

Grease all grease points until fresh grease shows. Liberally apply used engine oil along the whole length of the hinges of each wing section. The centre clutch coupling and wing shafts must be removed and stored under cover. Smear grease on the chrome ram rods for protection.

After storage

Disassemble clutches and with an emery cloth remove all traces of rust on the metal clutch plates. Check condition of the friction plates, if there is any sign of over heating, wear or cracking, replace with new. Do not attempt to use the machine with damaged slip clutch plates.

Reassemble the clutch units and tighten the bolts to achieve the correct spring length. Do not over tighten or the clutches will not work.

Check condition of tyres and pressure then follow the maintenance procedure covered in the servicing part of this manual. Pay particular attention to the condition of guards and blades.

Remember the 450-9S is designed to withstand the most rigorous conditions and, with a little care and attention, will give many years of trouble free service. So as not to invalidate the warranty and to avoid problems, use only genuine parts and make sure the machine is not driven at a speed in excess of 540/1000r.p.m. on the p.t.o..



Trouble shooting guide



Broken or damaged blades

1. Raise cutting height to avoid striking the ground
2. Remove or avoid obstacles such as rocks
3. Check rotor speed
4. Insure a steady feed into drive (Do not snatch the P.t.o.)

Damaged blade holder

1. As above
2. Failure to keep tight centre retaining nut

Damage gearboxes

1. Seized slip clutch.
2. Telescopic shafts bottoming out
3. Engaging drive with too much power / revs
4. Lack of grease on sliding tubes of drive shaft

Damage to P.t.o. shaft

1. Seized slip clutch
2. Telescopic tube bottoming out
3. Engaging drive with too much power / revs
4. Turning too sharp
5. Not enough overlap
6. Lack of grease
7. Build up of Debris under drive shaft

Gearbox overheating

1. Incorrect oil level
2. Incorrect grade of oil
3. Incorrect operating speed
4. Machine overloaded
5. Rubbish around the gearbox reducing air circulation

Slip clutches overheating

1. Machine overloaded
2. Incorrect operating speed
3. Incorrect setting
4. Blades hitting the ground

Oil leak from gearbox

1. Damaged shaft seal check for foreign matter (wire-string)
2. Faulty breather
3. Damaged gasket
4. Incorrect oil level

Rear axle UJ's broken

1. Travelling too fast over rough ground
2. Machine too high / low before wings raised

Metal fatigue on frame

1. Too fast a travelling / operating speed for conditions
2. Wings not floating i.e. following the ground contours (check detent)
3. Used in a manor or condition contra to it intended purpose

Excessive skid wear

1. Set skids above the ground

Ordering Parts

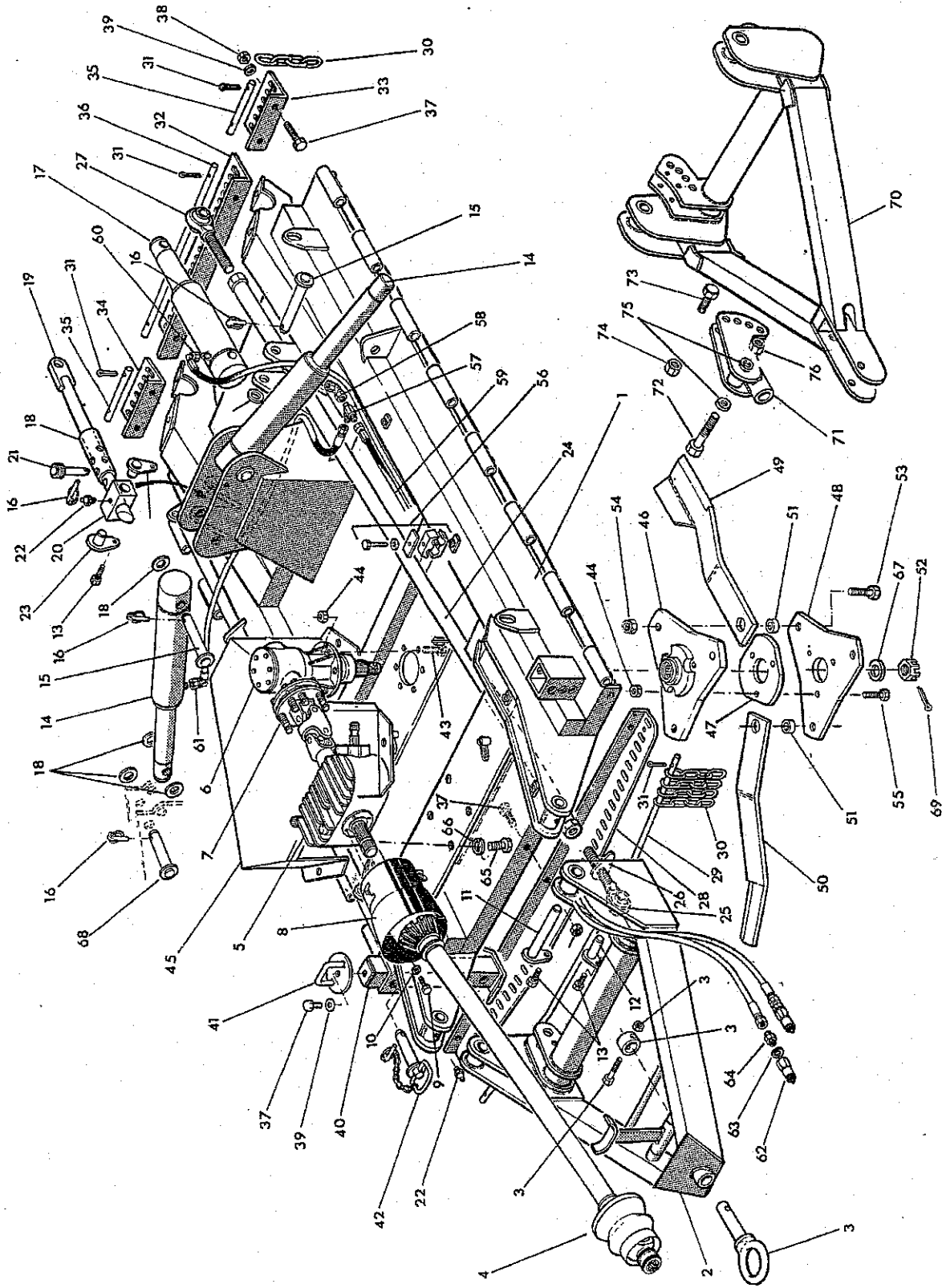
When ordering parts please refer to your parts list to help your dealer with your order. Please provide the following:

- Model No.
- Part No. and quantity
- Description
- Serial No of your machine
- Delivery instructions (e.g. next day)

Delivery is normally via carrier direct to your dealer. Services that are currently available are Next Day with the additional option of before 9am, 10.30am or Noon. Carriers also offer a 2-3 day service for light and small parts, these can be posted first or second class mail.

Spearhead factory works within normal factory working hours Monday - Friday 8:30am to 5:00pm. The factory is closed at weekends and Bank Holidays.

Please speak to your dealer to ensure for additional cover over weekends etc. if this is necessary.



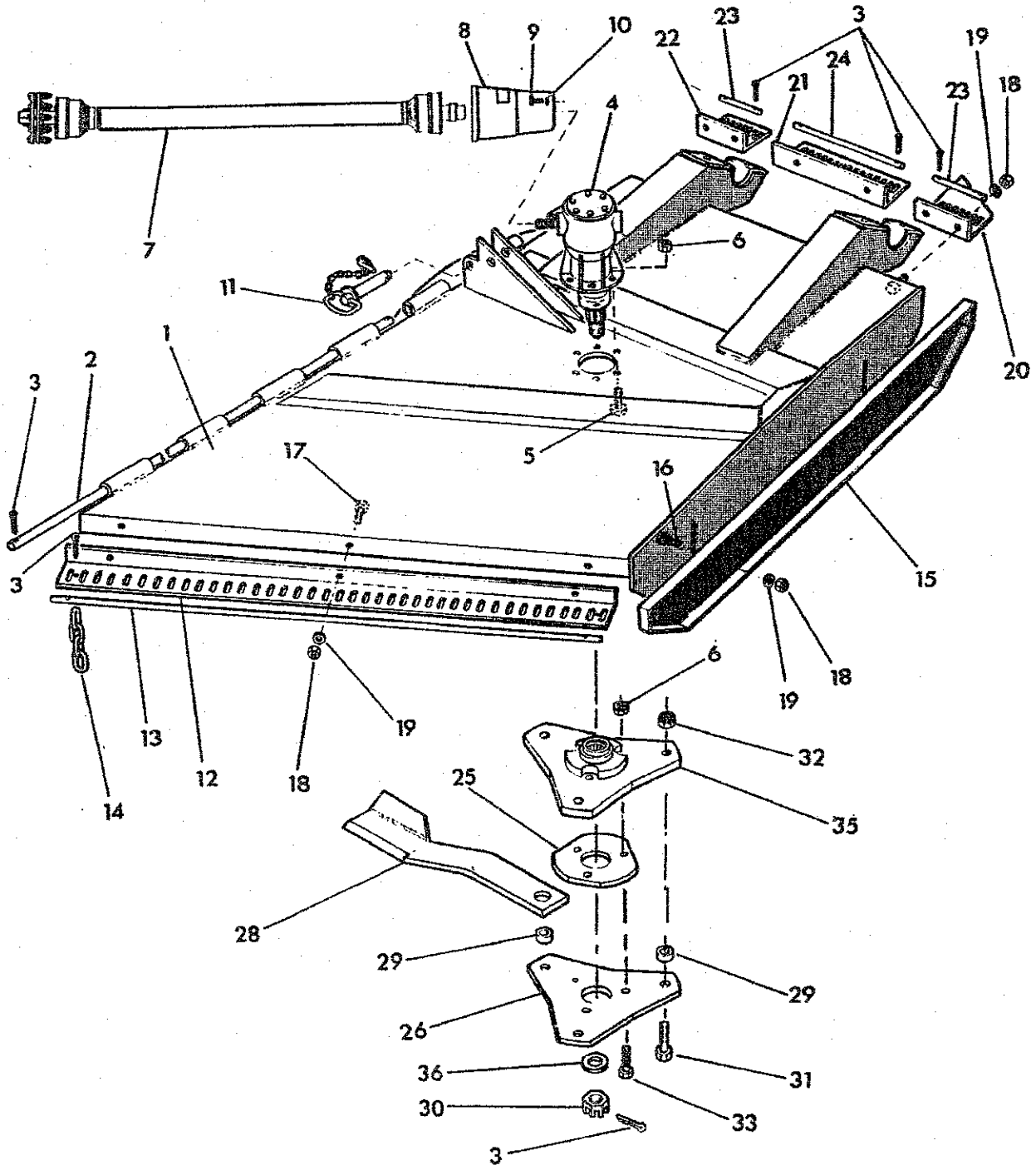
Main Section Assembly
(Compatible for all 450-9S machines)

Parts list - 450-9S Centre Section Assembly (Compatible for all 450-9S machines)

Fig. Ref	Part number	Item description
1	1770658	Centre section
2	1770652	Drawbar
3	6770630	Hitch eye
4	5770071	Input drive shaft (540r.p.m.) c/w joint
	5770074	Input drive shaft (1000r.p.m.) c/w joint
5	5770001	Splitter gearbox (540r.p.m.)
	5769999	Splitter gearbox (1000r.p.m.)
6	5770004	Centre gearbox (540r.p.m.)
	5770005	Centre gearbox (1000r.p.m.)
7	5770030	Centre coupling clutch (540r.p.m.)
	5770031	Centre coupling clutch (1000r.p.m.) <i>Pre - Serial No. 990177453</i>
	5770031A	Centre coupling clutch (1000r.p.m.) <i>Post - Serial No. 990177446</i>
8	5770128	Plastic cone
9	2770401	Screw
10	2770432	Washer
11	1770627	Pear pin
12	1770628	Pear pin
13	2770421	Screw
14	3570634	Ram
15	1770625	Pin
16	6310206	Lynch pin
	2770475	Roll pin (<i>optional</i>)
17	3570635	Ram
18	1770639	Height control sleeve
19	1770623	Height control bar
20	1770641	Pivoting stop block
21	6310202	Pin
22	2770467	Grease nipple
23	1770640	Pear pin
24	1770655	Tie bar
25	6770631	Forged link end (<i>right hand</i>)
26	6310216	Collar
27	6770638	Forged link end (<i>left hand</i>)
28	1770595	Front skirt bracket
29	1770651	Chain retaining bar
30	8770621	Chain
31	2770513	Split pin
32	1770616	Skirt bracket
33/34	1770615	Skirt bracket
35	1770614	Chain retaining bar
36	1770617	Chain retaining bar
37	2770420	Bolt

Parts list - 450-9S Centre Section Assembly(Compatible for all 450-9S machines)

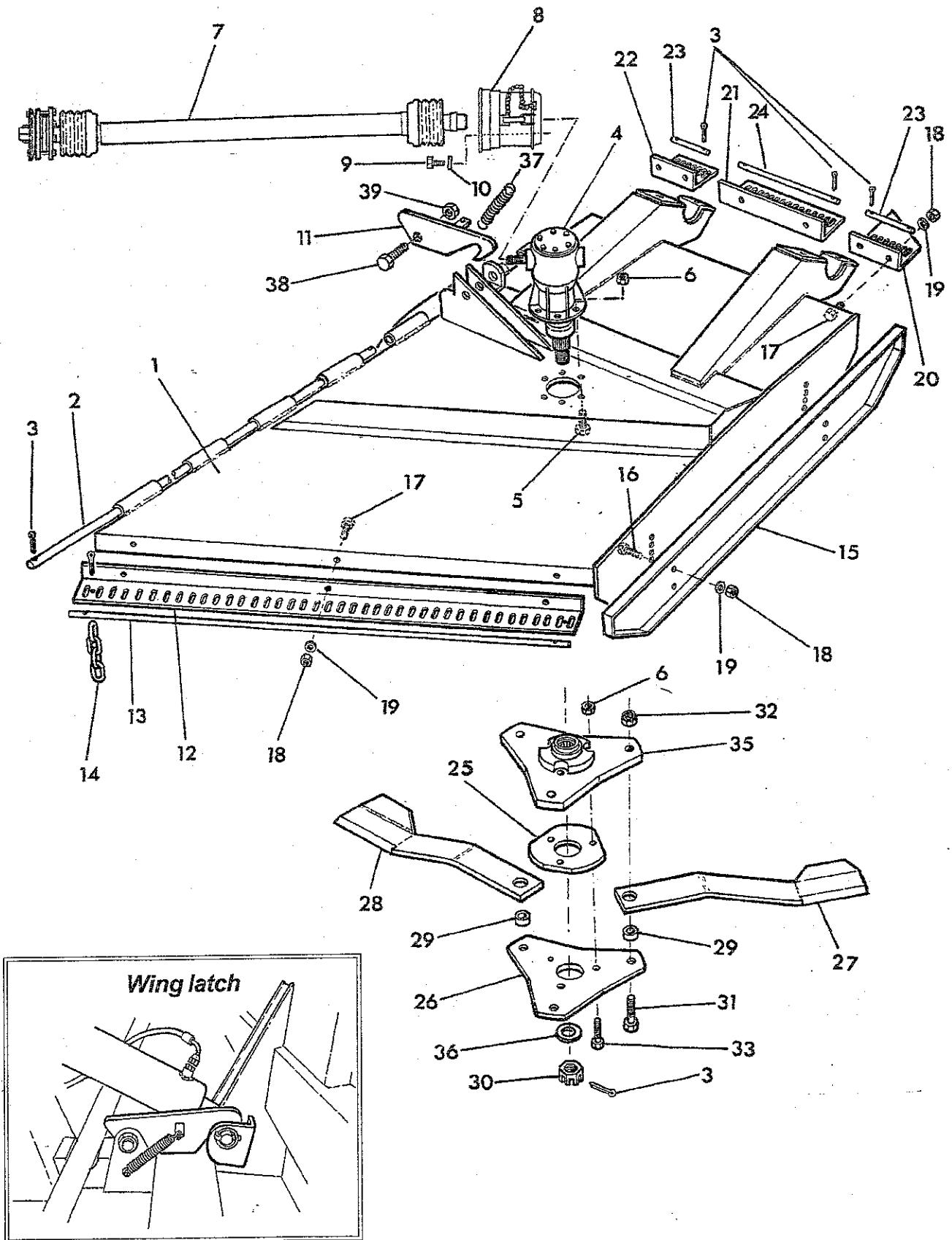
Fig. Ref	Part number	Item description
38	2770417	Nyloc nut
39	2770436	Washer
40	1770653	Unhitching stand
41	1770594	Stand handle
42	6310215	Pin whit handle
43	2770423	Bolt
44	2770447	Nyloc nut
45	1770593	Centre drive guard
46	1770602/3	Centre blade carrier - upper
47	1770604/3	Blade carrier spacer
48	1770605/3	Centre blade carrier - lower
49	7770700	Right hand blade c/w fin
50	2770436	Washer
51	7770707	Blade bush
52	5771409	Castle nut
53	2770413	Blade bolt
54	2770414	Nyloc nut
55	2770404	Bolt
56	3870632	Plastic pipe block
57	3460103	Tee
58	3450155	Elbow
59	3750159	Left wing ram hose
60	3750160	Height ram hose
61	3750161	Right wing ram hose
62	3750153	Quick release coupling
63	3260072	Bonded seal
64	3250154	Restrictor
65	2770429	Bolt
66	2770455	Washer
67	5771410	Domed washer
68	1770624	Pin
69	2770477	Gearbox split pin
70	1770659	Drawbar
71	1770661	Towing eye
72	2770365	Bolt
73	2770367	Bolt
74	2770409	Nut
75	2770464	Washer
76	2770414	Nut



Wing Section Assembly
(Pre - Serial No. 990177453)

Parts list - Wing Section Assembly (Pre - Serial No. 990177453)

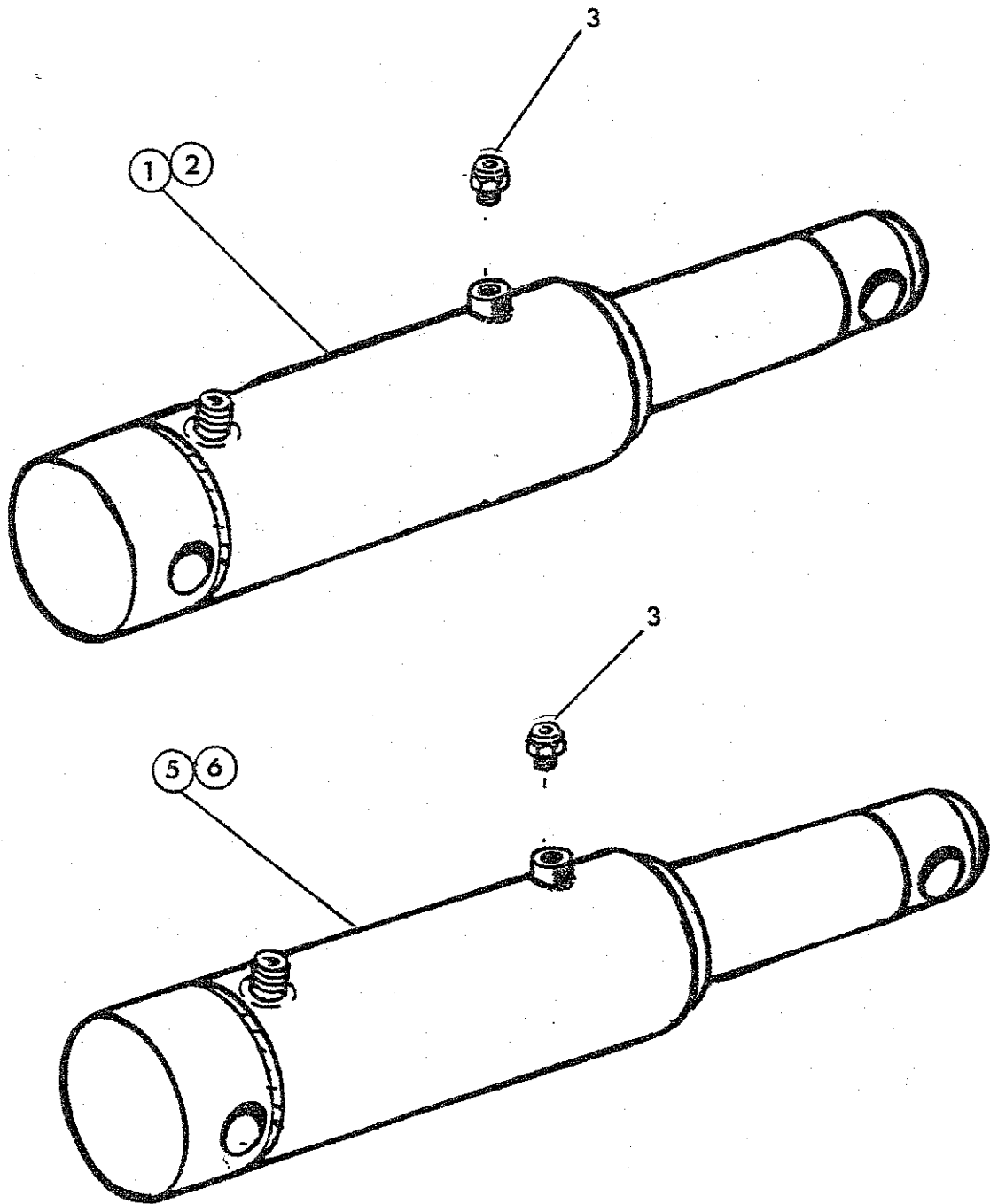
Fig. Ref	Part number	Item description
1	1770656	Left hand wing section
	1770654	Right hand wing section
2	1770657	Hinge bar
3	2770513	Split pin
4	5770002	Left rotor gearbox (540r.p.m.)
	5770007	Left rotor gearbox (1000r.p.m.)
	5770003	Right rotor gearbox (540r.p.m.)
	5770006	Right rotor gearbox (1000r.p.m.)
5	2770423	Bolt
6	2770447	Nut
7	5770070	Wing drive shaft
8	5770106	Plastic cone
9	2770431	Screw
10	2770432	Washer
11	6310215	Pin with handle
12	1770577	Skirt bracket left hand
	1770576	Skirt bracket right hand
13	1770619	Chain retaining bar
14	8770621	Chain - 4 link
15	1770592	Wing skid
16	2770397	Bolt
17	2770443	Bolt
18	2770417	Nyloc nut
19	2770436	Washer
	8770620	Chain - 3 link
20	1770591	Outer wing skirt bracket left hand
	1770590	Outer wing skirt bracket right hand
21	1770575	Middle section bracket
22	1770574	Wing inner Left hand
	1770573	Wing inner right hand
23	1770610	Chain retaining bar
24	1770613	Chain retaining bar
25	1770604/3	Blade carrier spacer
26	1770606/3	Blade carrier - lower
28	7770701	Left hand blade c/w fin
	7770700	Right hand blade c/w fin
29	7770707	Blade bush
30	5771409	Castle nut
31	2770413	Blade bolt
32	2770414	Nut
33	2770404	Bolt
34	2771408	Split pin
35	1770603/3	Blade carrier - upper
36	5771410	Domed washer



Wing Section Assembly
(Post - Serial No. 891077446)

Parts list - Wing Section Assembly (Post - Serial No. 89077446)

Fig. Ref	Part number	Item description
1	1770656A	Left hand wing section
	1770654A	Right hand wing section
2	1770657	Hinge bar
3	2770513	Split pin
4	5770002	Left rotor gearbox (540r.p.m.)
	5770007	Left rotor gearbox (1000r.p.m.)
	5770003	Right rotor gearbox (540r.p.m.)
	5770006	Right rotor gearbox (1000r.p.m.)
5	2770423	Bolt
6	2770447	Nut
7	5770039	Wing drive shaft
8	5770105A	Plastic cone
9	2770431	Screw
10	2770432	Washer
11	1770660	Left hand latch
	1770660R	Right hand latch
12	1770577	Skirt bracket left hand
	1770576	Skirt bracket right hand
13	1770619	Chain retaining bar
14	8770621	Chain - 4 link
15	1770592	Wing skid
16	2770397	Bolt
17	2770443	Bolt
18	2770417	Nyloc nut
19	2770436	Washer
	8770620	Chain - 3 link
20	1770591	Outer wing skirt bracket left hand
	1770590	Outer wing skirt bracket right hand
21	1770575	Middle section bracket
22	1770574	Wing inner Left hand
	1770573	Wing inner right hand
23	1770610	Chain retaining bar
24	1770613	Chain retaining bar
25	1770604/3	Blade carrier spacer
26	1770606/3	Blade carrier - lower
27	7770700	Right hand blade c/w fin
28	7770701	Left hand blade c/w fin
29	7770707	Blade bush
30	5771409	Castle nut
31	2770413	Blade bolt
32	2770414	Nut
33	2770404	Bolt
34	2771408	Split pin
35	1770603/3	Blade carrier - upper
36	5771410	Domed washer
37	6310209	Spring
38	2770413	Bolt
39	2770414	Nut

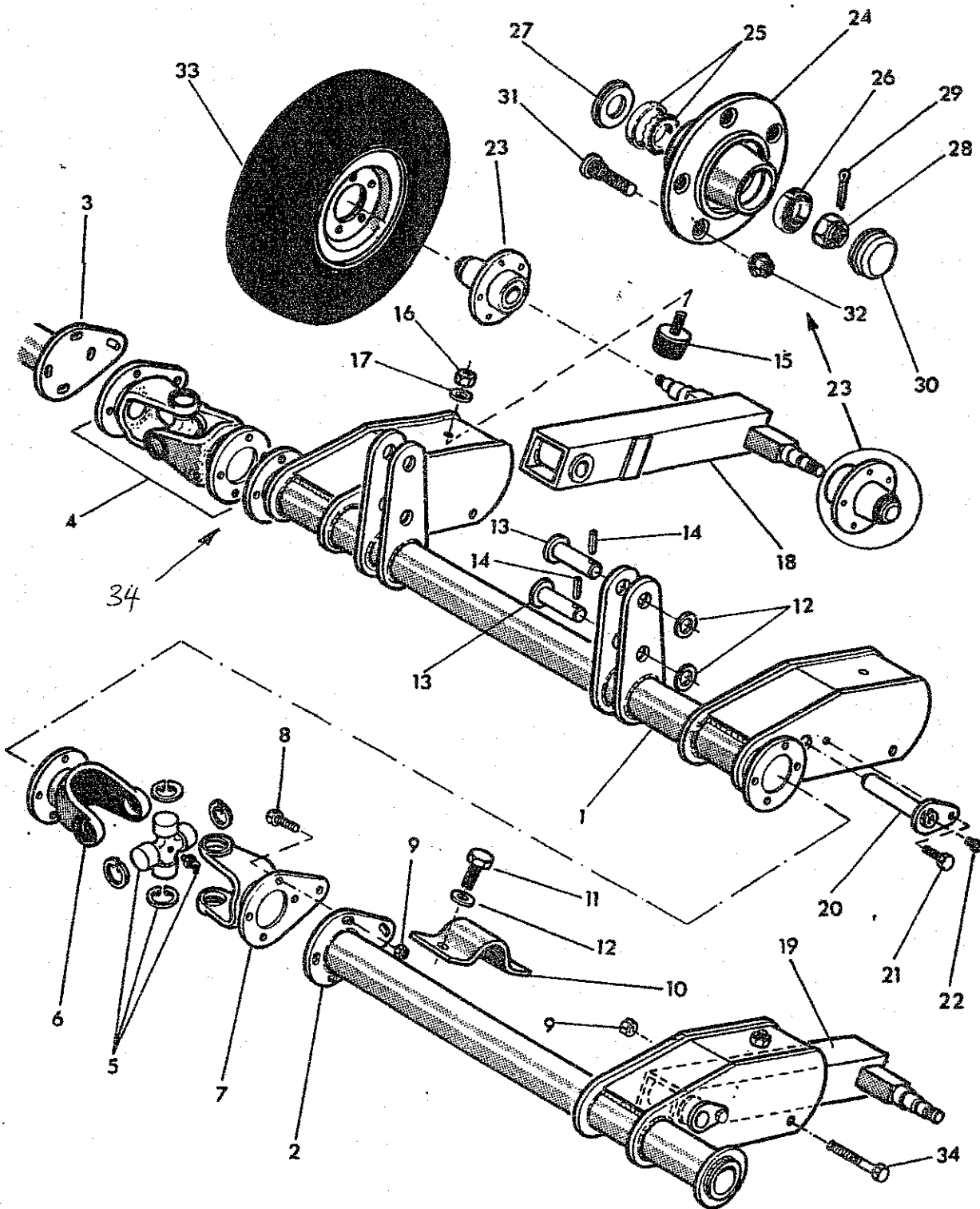


Hydraulic Cylinders Assembly
(Compatible for all 450-9S machines)

Parts list - Hydraulic Cylinders Assembly (Compatible for all 450-9S machines)

Fig. Ref	Part number	Item description
1	3570634	Wing ram
2	3570661	Seal kit
3	3570660	Breather
5	3570635	Height ram
6	3570661	Seal kit

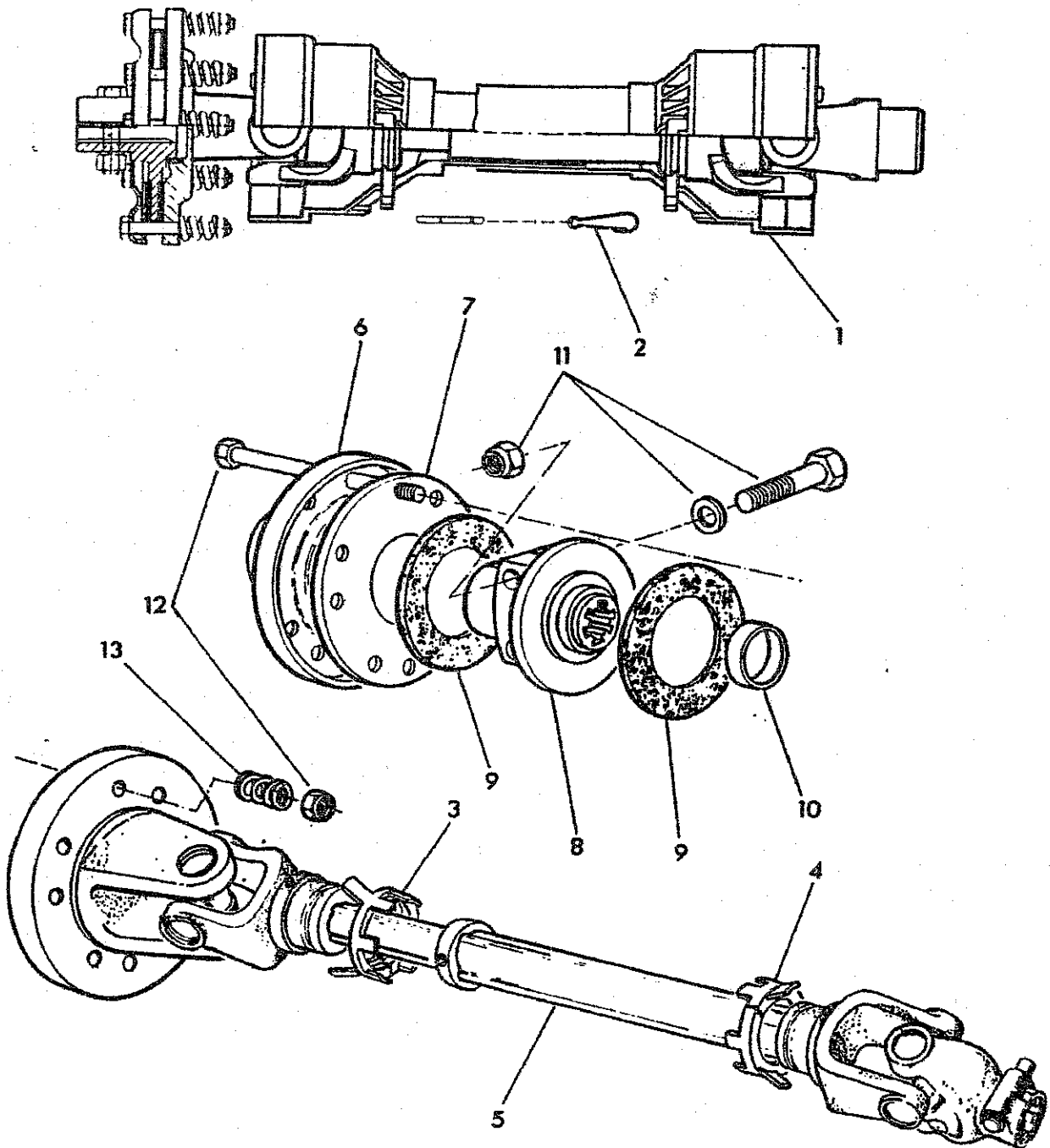
When ordering your seal kits please quote both codes stamped on the base of the cylinder.



Wheel & Axle Assembly
(Compatible for all 450-9S machines)

Parts list - Wheel & Axle Assembly (Compatible for all 450-9S machines)

Fig. Ref	Part number	Item description
1	1770607	Rear axle centre section
2	1770611	Rear axle left section
3	1770612	Rear axle right section
4	1770643	Rear axle U.J. complete left hand
	1770644	Rear axle U.J. complete right hand
5	5770102	Cross journal
6	1770589	Round flange axle yoke
7	1770588	Pear flange axle yoke LH (1770588 R Pear Flange RH)
8	2770443	Bolt
9	2770417	Nyloc nut
10	1770608	Rear axle U bracket
11	2770403	Bolt
12	2770464	Washer
13	1770624	Pin
14	2770475	Roll pin
15	8770644	Rubber cushion block
16	2770447	Nyloc nut
17	2770454	Washer
18	1770587	Double wheel arm (25mm pin)
	1770585	Double wheel arm (30mm pin)
19	1770586	Single wheel arm (25mm pin)
	1770584	Single wheel arm (30mm pin)
20	1770626	Pear pin (25 x 135mm)
	1770583	Pear pin (30 x 135mm)
21	2770418	Screw
	2770484	Screw for 30mm pear pin
22	2770468	Large grease nipple
23	6770582	Hub c/w stub axle
24	6770581	Hub
25	4770660	Bearing inner (45mm)
	4770660A	Bearing inner (40mm)
26	4770659	Bearing outer
27	4770661	Seal (45mm)
	4770661A	Seal (40mm)
28	6770583	Castle nut
29	6770584	Split nut
30	6770580	Hub cap
31	6770579	Wheel stud
32	6770578	Wheel stud nut
33	6770674	Complete wheel assembly
	6770650	Tyre
34	1770663	3mm SPACER
	1770662	5mm SPACER

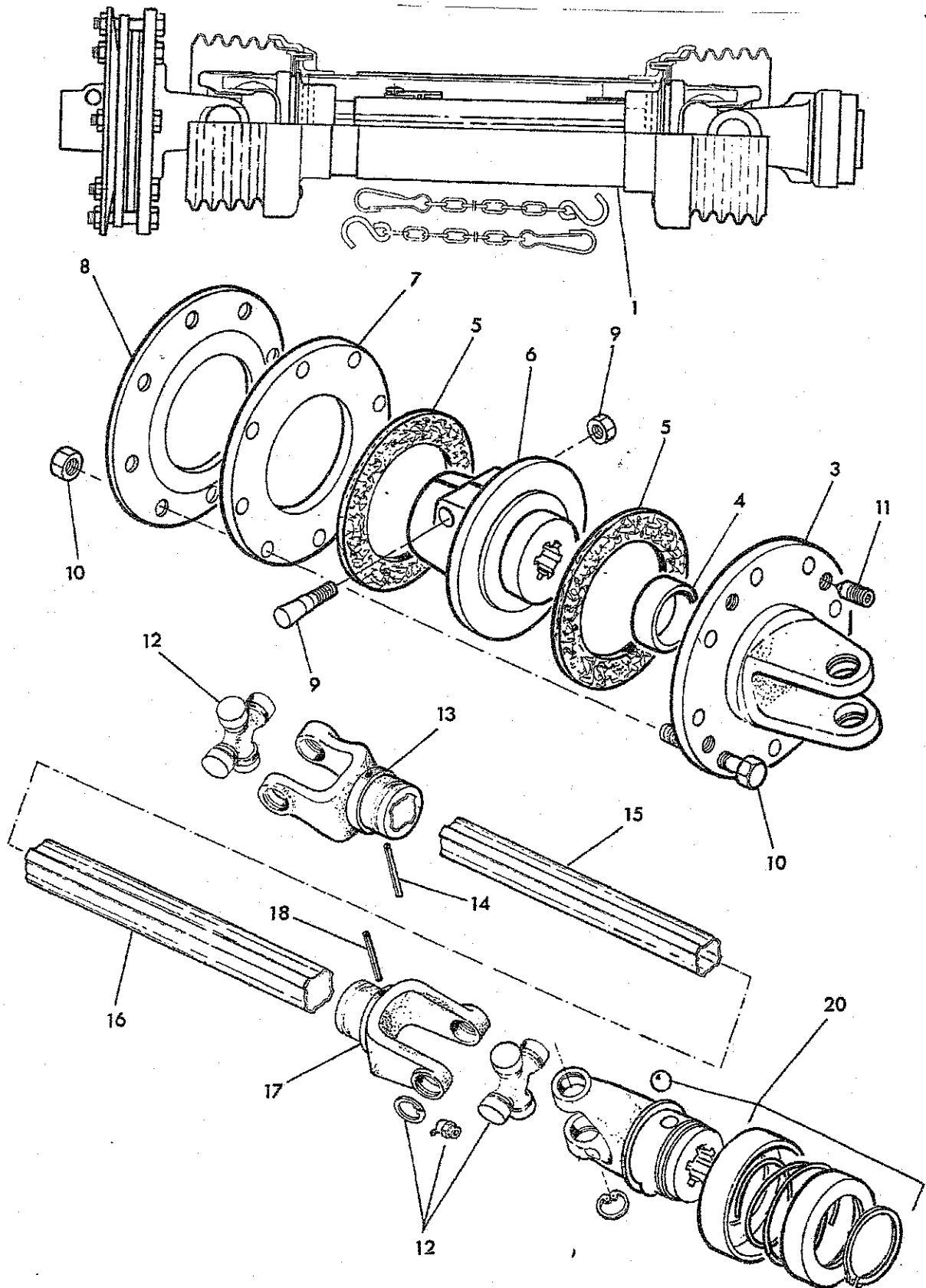


Wing Shaft Assembly
(Pre - Serial No. 991477494)

Parts list - Wing Shaft Assembly

(Pre - Serial No. 991477494)

Fig. Ref	Part number	Item description
1	5771332	Complete wing safety guard
	5771333	Inner & outer tube guard set
2	5771020	Retaining chain
3	5771313	Inner bearing
4	5771308	Outer bearing
5	5771334	Balanced shaft c/w yokes
6	5771324	Pressure plate
7	5771323	Inner plate
8	5770093	Flange hub 6 spline
9	5771320	Clutch plate
10	5771319	Bush
11	5770091	Bolt set (2)
12	5771325	Clutch plate bolt c/w nut
13	5771317	Spring

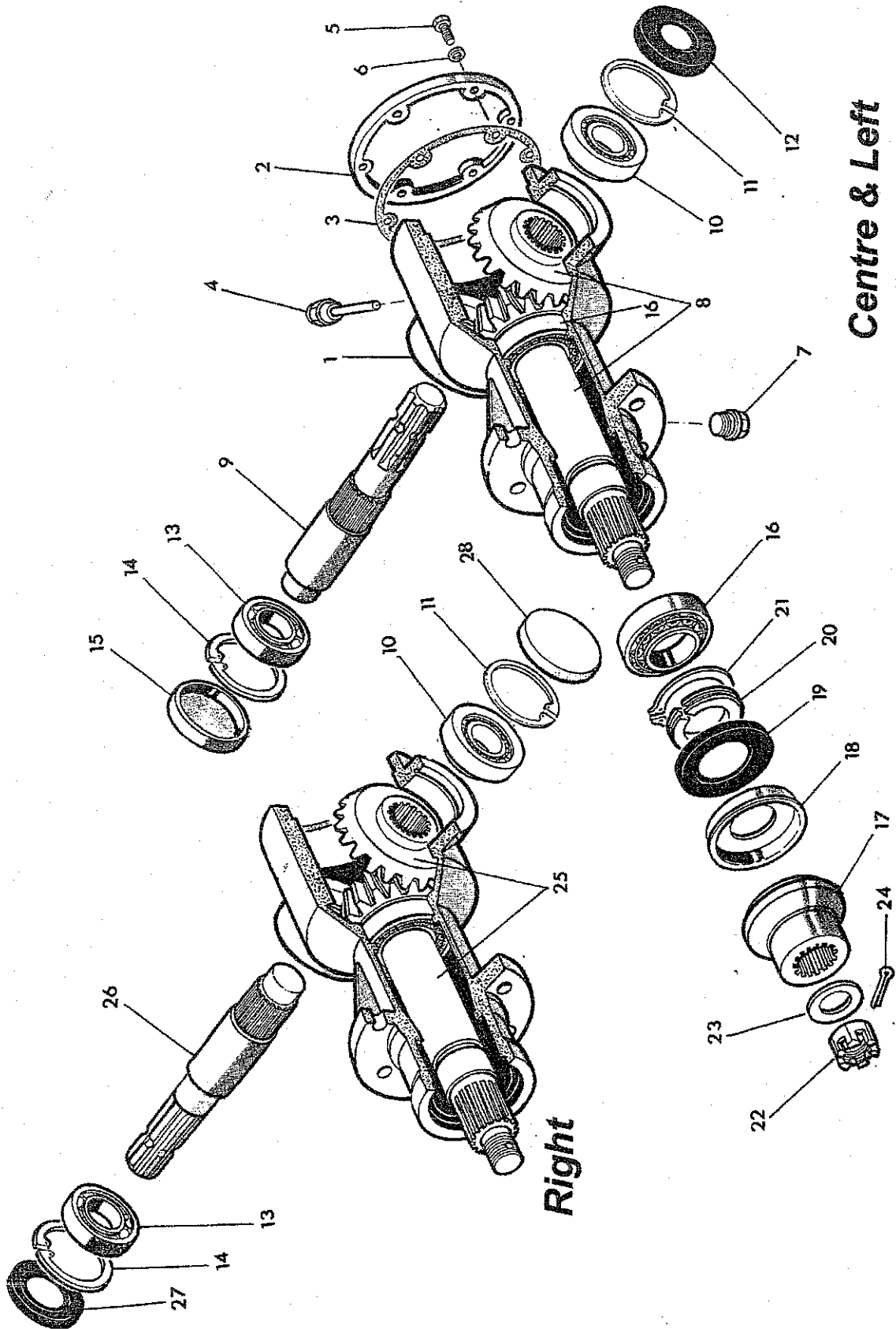


Wing Shaft Assembly
(Post - Serial No. 991477493)

Parts list - Wing Shaft Assembly (Post - Serial No. 991477493)

Fig. Ref	Part number	Item description
1	5771333	P.t.o. guard
3	5770131	Flanged yoke
4	5771319	Bush
5	5771328	Clutch plate
6	5770134	Hub
7	5770135	Inner plate
8	5770136	Pressure plate
9	5771322	Taper pin
10	5770138	Clutch plate bolt
11	5770139	Screw
12	5770140	Cross journal
13	5770145	Inner tube yoke
14	5770143	Roll pin
15	5770141	Inner tube
16	5770142	Outer tube
17	5770146	Outer tube yoke
18	5770144	Roll pin
20	5770130	Quick release

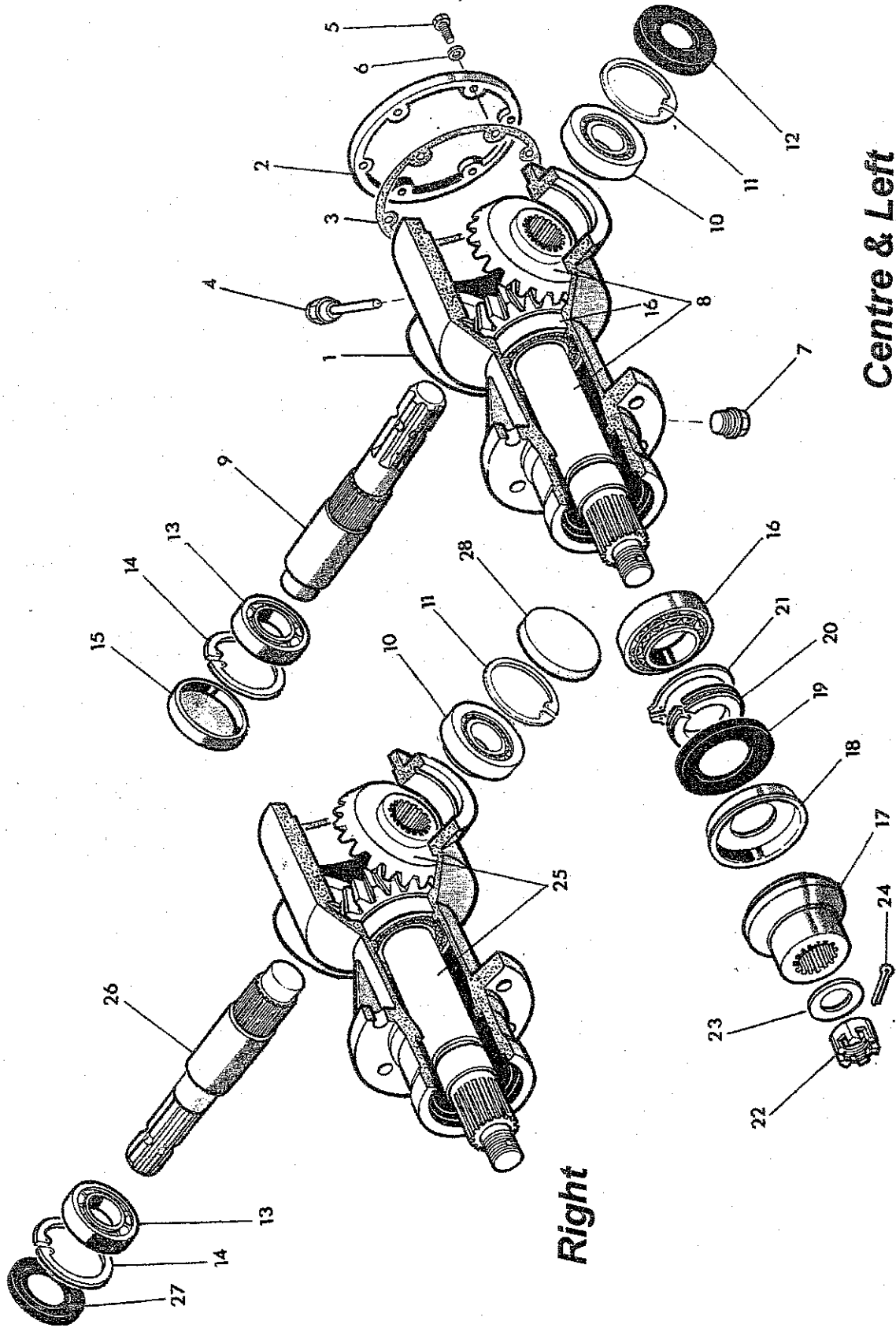
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540r.p.m. gearboxes Assembly
(Compatible for all 450-9S machines)

Parts list - 540r.p.m. Gearboxes Assembly (Compatible for all 450-9S machines)

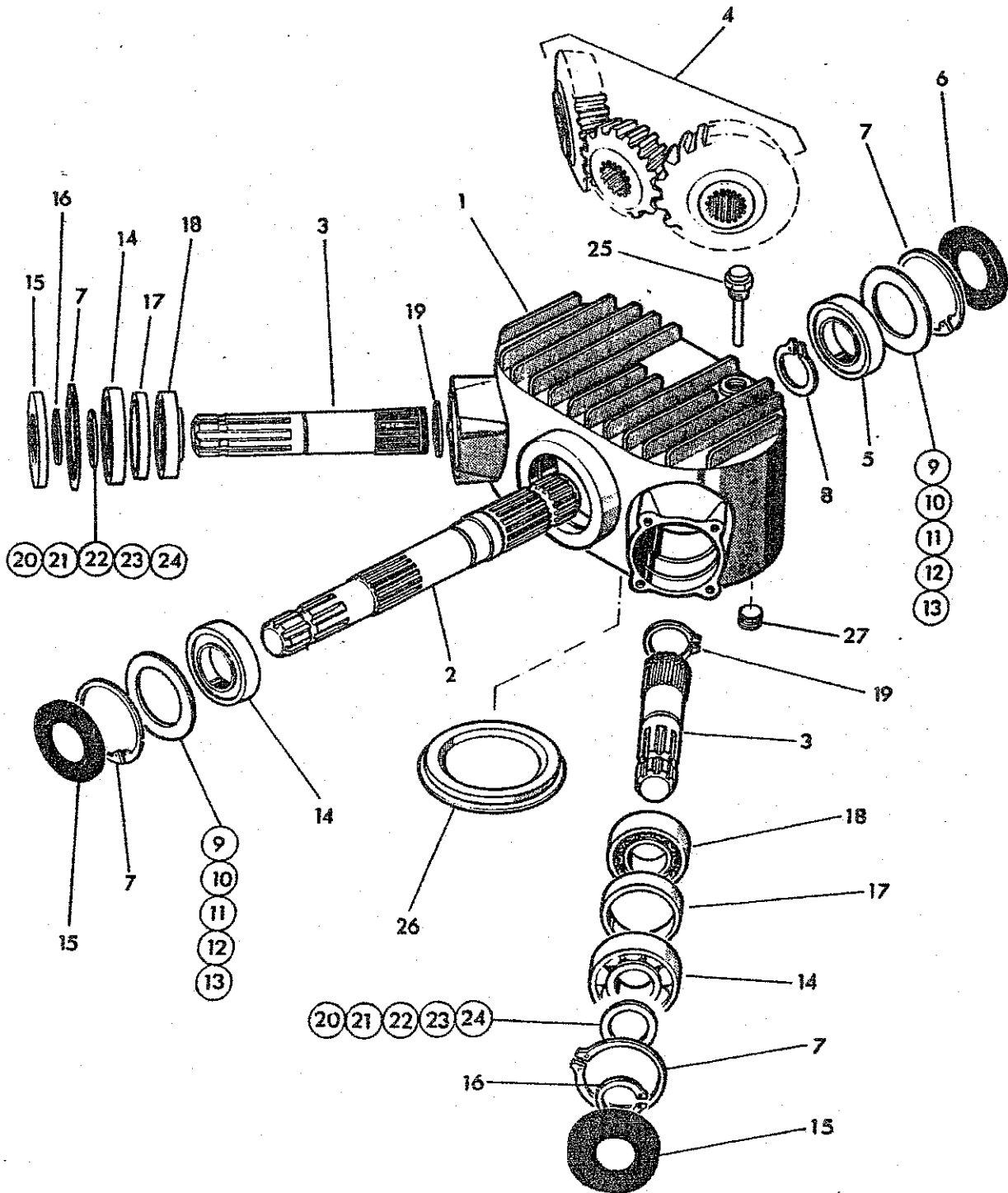
Fig. Ref	Part number			Item description
	3070 ISO F2	3070 ISO R2	577004	→ 3070 192 R2
	5770003 450R/H	5770002 540L/H	577004 540 centre	
1	5771402	5771402	5771402	Casing
2	5771401	5771401	5771401	Cover
3	5771405	5771405	5771405	Gasket
4	5771416	5771416	5771416	Dipstick
5	5771407	5771407	5771407	Screw
6	2771408	2771408	2771408	Washer
7	5771415	5771415	5771415	Oil plug
8		5771419	5771418	Gear set
9		5771403R	5771403R	Input shaft
10	4771601	4771601	4771601	Bearing
11	2771129	2771129	2771129	Circlip
12		4771124	4771124	Oil seal
13	4771600	4771600	4777600	Bearing
14	2771108	2771108	2771108	Circlip
15		4771503	4771503	End seal
16	4771602	4771602	4771602	Bearing
18	5771406	55771406	5771406	Cover
19	4771500	4771500	4771500	Seal
20	5771422	5771422	5771422	Collet
21	2771600	2771600	2771600	Circlip
22	5771409	5771409	5771409	Castle nut
23	5771410	5771410	5771410	Domed washer
24	2770477	2770477	2770477	Split pin
25	5771419			Gear set
26	5771403F			Input shaft
27	4771501			Oil seal
28	4771502			End seal
	5771423	5771423	5771423	Shim set



1000r.p.m. Assembly
(Compatible for all 450-9S machines)

Parts list - 1000r.p.m. Gearboxes Assembly (Compatible for all 450-9S machines)

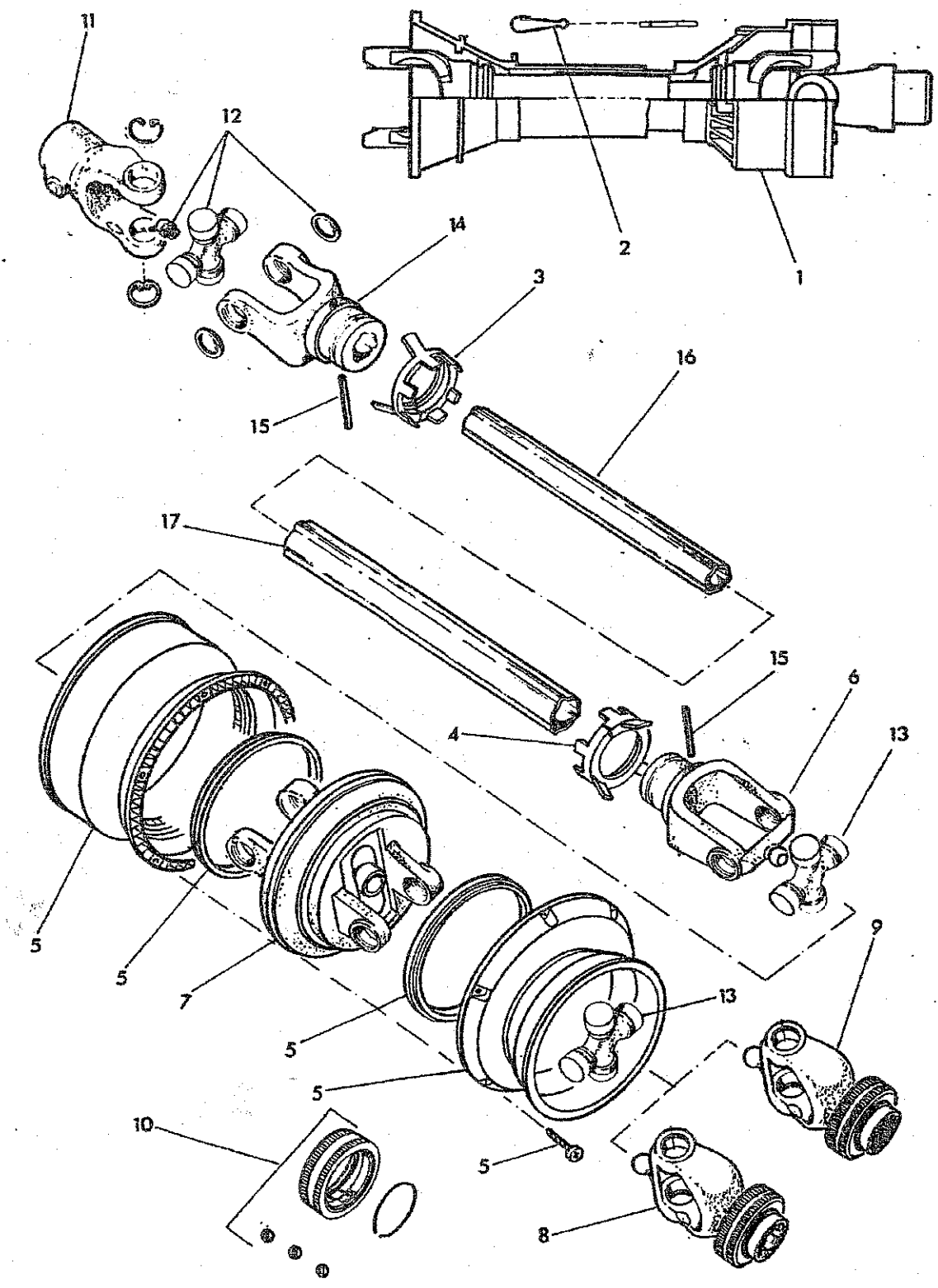
Fig. Ref	Part number			Item description
	<i>5770006</i>	<i>5770007</i>	<i>577005</i>	
	<i>1000R/H</i>	<i>1000L/H</i>	<i>1000 centre</i>	
1	5771402	5771402	5771480	Casing
2	5771401	5771401	5771481	Cover
3	5771405	5771405	5771405	Gasket
4	5771416	5771416	5771482	Dipstick
5	5771407	5771407	5771407	Screw
6	2771408	2771408	2771408	Washer
7	5771415	5771415	5771415	Oil plug
8		5771420	5771417	Gear set
9		5771403R	5771403C	Input shaft
10	4771601	4771601	4771601	Bearing
11	2771129	2771129	2771129	Circlip
12		4771124	4771124	Oil seal
13	4771600	4771600	4770658	Bearing
14	2771108	2771108	2771108	Circlip
15		4771503	4771503	End seal
16	4771602	4771602	4771602	Bearing
			4771603	Bearing (Top)
18	5771406	5771406	5771406	Cover
19	4771500	4771500	4771500	Seal
20	5771422	5771422		Collet
21	2771600	2771600		Circlip
22	5771409	5771409	5771411	Castle nut
23	5771410	5771410	5771412	Domed washer
24	2770477	2770477	2770477	Split pin
25	5771420			Gear set
26	5771403F			Input shaft
27	4771501			Oil seal
28	4771502			End seal
	5771423	5771423	5771423	Shim set
			5771479	Shaft
			5771478	Nut
			5771477	Spacer



Splitter Gearbox Assembly
(Compatible for all 450-9S machines)

Parts list - Splitter Gearbox Assembly *(Compatible for all 450-9S machines)*

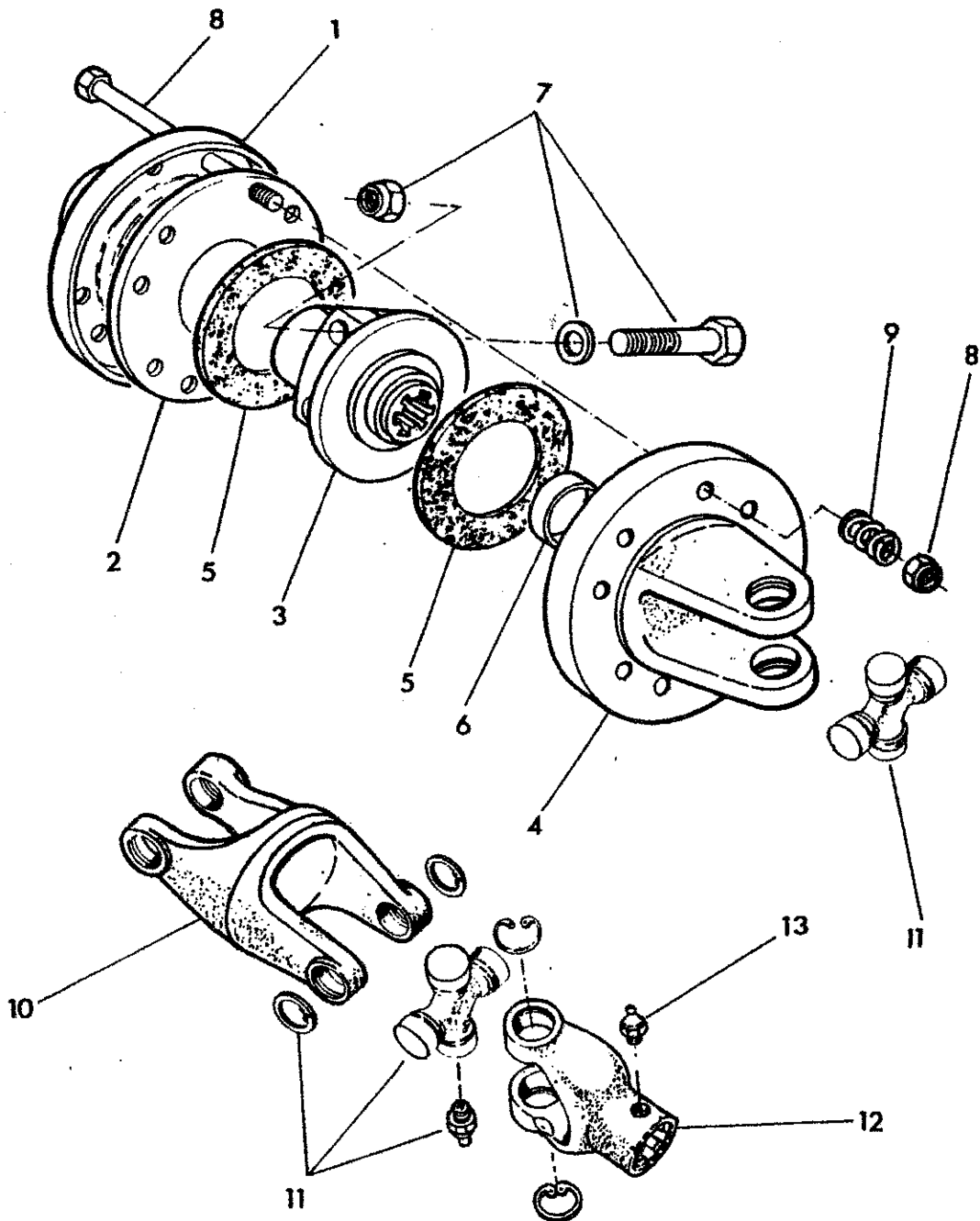
Fig. Ref	Part number	Item description
1	5771101	Casing
2	5771102	Central shaft
3	5771103	Outer shaft
4	5771127	Gearset of 3 540r.p.m.
	5771128	Gearset of 3 1000r.p.m.
5	4771620	Bearing
6	4771504	Seal
7	2771129	Circlip
8	2777514	Circlip
9 to 13	5771126	Shim set
14	4771605	Bearing
15	4771124	Seal
16	2777516	Circlip
17	5771104	Spacer
18	4771606	Bearing
19	2777512	Circlip
20 to 24	2771106	Shim set
25	5771416	Dipstick
26	5771105	Cover
27	5771126	Oil plug



Input Shaft Assembly
(Compatible for all 450-9S machines)

Parts list - Input Shaft Assembly *(Compatible for all 450-9S machines)*

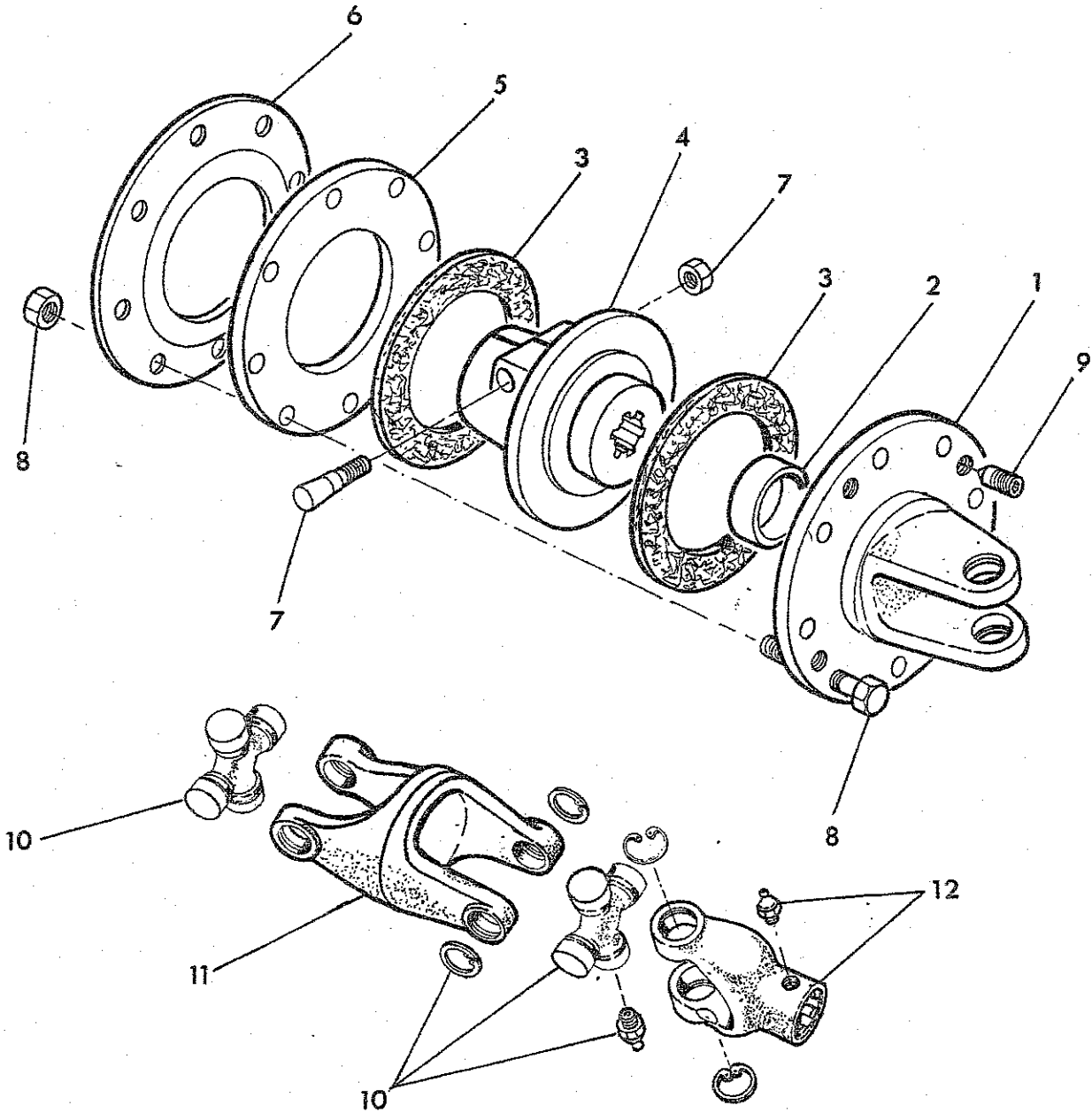
Fig. Ref	Part number	Item description
1	5771032	Complete input p.t.o. guard
2	5771020	Retaining chain
3	5771019	Inner bearing
4	5771014	Outer bearing
5	5771022	Complete c/v joint guard
6	5771006	Outer tube w/a yoke
7	5771005	Central c/v body
8	5771001	Yoke with bridge 6 spline
9	5771000	Yoke with bridge 21 spline
10	5771024	Plastic release ring
11	5771013	Yoke c/w taper pin
	5771025	Large taper pin
12	5771012	Cross journal assembly <i>(ordinary)</i>
13	5771002	Cross journal assembly w/a
14	5771011	Inner tube yoke
15	2770516	Roll pin
16	5771010	Inner cardan tube <i>(coated)</i>
17	5771009	Outer cardan tube



Coupling Assembly
(Compatible to all 540r.p.m
& Pre - Serial No. 991477494 for 1000r.p.m.)

Parts list - Coupling Assembly

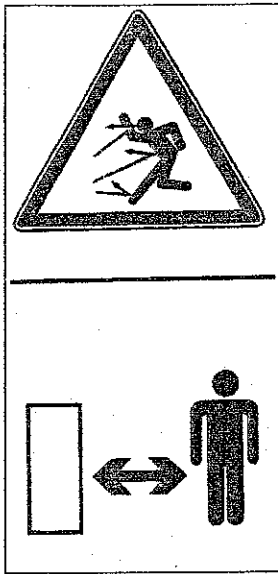
Fig. Ref	Part number	Item description
<i>Compatible to all 450r.p.m & Pre - Serial No. 991477494 for 1000r.p.m. machines</i>		
1	5771324	Pressure plate
2	5771323	Inner plate
3	5770093	Flange hub 6 spline (540r.p.m.)
	5770094	Flange hub 21 spline (1000r.p.m.)
4	5771318	Flange yoke
5	5771320	Clutch plate
6	5771319	Bush
7	5770091	Bolt set (2)
8	5771325	Clutch plate bolt c/w nut
9	5771317	Spring
10	5770092	Back to back yoke
11	5771301	Cross journal assembly
12	5770121	Floating yoke 6 spline
13	2770467	Grease nipple size



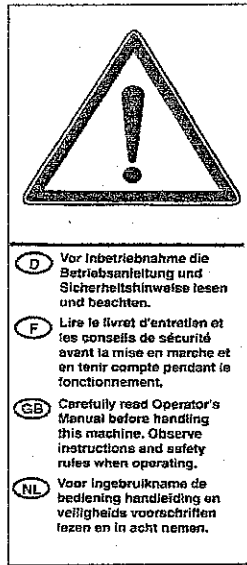
**1000r.p.m. coupling Assembly
(Post - Serial No. 990177493)**

Parts list - 1000r.p.m. Coupling Assembly (Post - Serial No. 990177493)

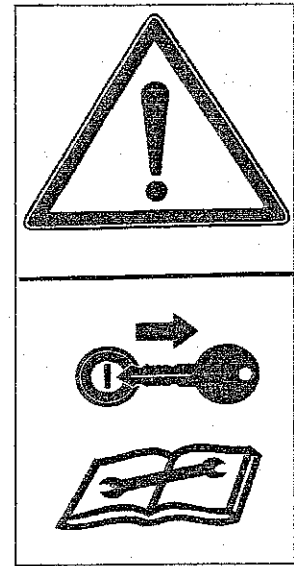
Fig. Ref	Part number	Item description
1	5770131	Flanged yoke
2	5771319	Bush
3	5771328	Clutch plate
4	5770134	Hub
5	5770135	Inner plate
6	5770136	Pressure plate
7	5771322	Taper pin
8	5770138	Clutch plate bolt
9	5770139	Screw
10	5770140	Cross journal
11	5770132	Back to back yoke
12	5770137	Floating yoke



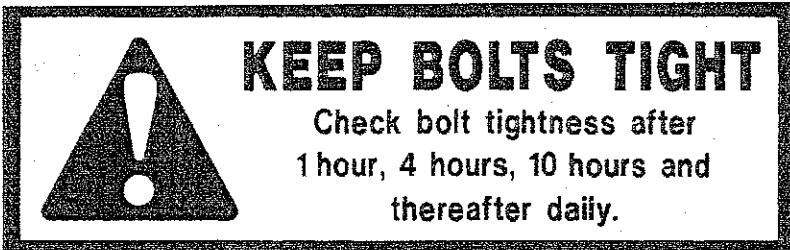
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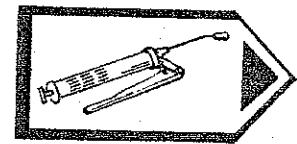
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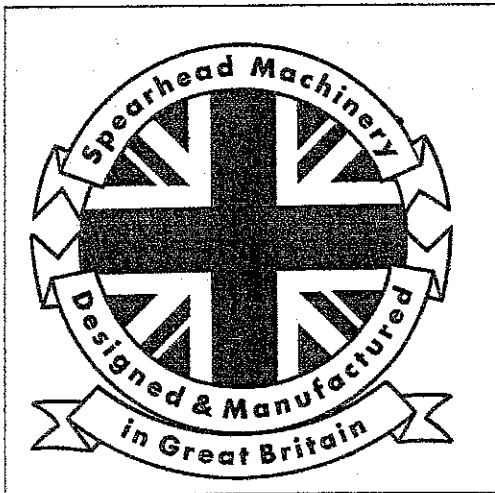
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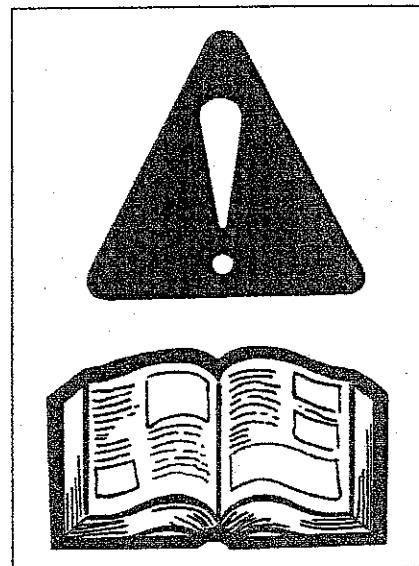
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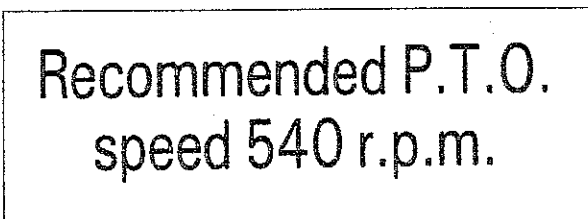
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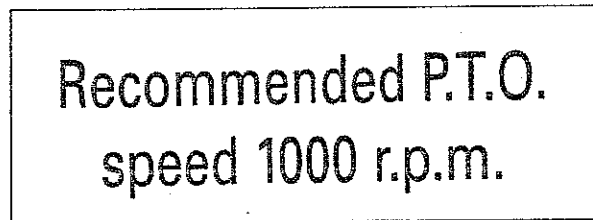
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9

Stickers
(Compatible to all 450-9S machines)

Parts list - Stickers *(Compatible to all 450-9S machines)*

Fig. Ref	Part number	Item description
1	8770357	"Keep safe distance when machine is running" sticker
2	8770363	"Read manual" sticker
3	8770358	"Shut off engine remove key" sticker
4	8770306	"Keep bolt tight" sticker
5	8770322	"Grease point" sticker
6	8770307	"Manufactured in Great Britain" sticker
7	8770340	"Read manual" sticker
8	8770305	"Recommended P.t.o. speed 450r.p.m." sticker
9	8770323	"Recommended P.t.o. speed 1000r.p.m." sticker

Spearhead

EC declaration of conformity, conforming to EEC directive 89/392/EEC

We, Spearhead Machinery Ltd, Pershore Trading Estate, Pershore, Worcestershire WR10 2DD declare under our sole responsibility that the

product

product code

serial no. & date

type

Manufactured by the above company complies with the required provisions of the directive 89/392/EEC, and AMD 91/368/EEC, AMD 93/44/EEC, AMD 93/68/EEC and conforms with European norm. BSEN 292; Part 1: 1991 safety of machinery - Terminology, methodology; Part 2; 1991 Safety of machinery - Technical specifications and other national standards associated with its design and constructions as listed in the Technical File.

Signed

on behalf of Spearhead Machinery Ltd

Status

Date

The Spearhead Warranty

Spearhead warrants that the Spearhead machine referred to in the Warranty Registration Form will be free from defects in materials and workmanship for a period of 12 months from the date of sale. This warranty does not affect your statutory rights, but merely adds to them. Should you have a problem within 12 months from the date of sale please contact your original Spearhead dealer, or Spearhead's Service Department. Any part found to be defective during this period will be replaced or repaired, at Spearhead's discretion, by the dealer or a Spearhead Service Engineer.

Spearhead Warranty Conditions

- 1 The Warranty Registration Form must be completed and returned to Spearhead within 30 days of the date of sale.
- 2 This warranty does not cover defects arising from fair wear and tear, wilful damage, negligence, misuse, abnormal working conditions, use in competition, failure to follow Spearhead's instructions (oral or written, including all instructions and recommendation made in the Operator's Manual) or alteration or repair of the machinery without Spear head's approval.
- 3 The machinery must have been serviced in accordance with the Operator's Manual and the Service Log must have been kept up to date and made available to the dealer should service, repair or warranty work be undertaken.
- 4 This warranty does not cover claims in respect of wearing parts such as blades, flails, paintwork, tyres, belts, hydraulic hoses, bearings, bushes, linkage pins, top links, ball ends unless there is a manufacturing or material defect or the cost of normal servicing items such as oils and lubricants.
- 5 This warranty does not cover any expenses or losses incurred whilst the machinery is out of use for warranty repairs or parts replacement.
- 6 This warranty does not extend to parts, materials or equipment not manufactured by Spearhead, for which the Buyer shall only be entitled to the benefit of any such warranty or guarantee given by the manufacturer to Spearhead. Only genuine Spearhead replacement parts will be allowable for warranty claims.
- 7 All parts replaced by Spearhead under warranty become the property of Spearhead and must be returned to Spearhead if Spearhead so request. Such parts may only be disposed of after a warranty claim has been accepted and processed by Spearhead.
- 8 Spearhead is not liable under this warranty for any repairs carried out without Spearhead's written consent or without Spearhead being afforded a reasonable opportunity to inspect the machinery the subject of the warranty claim. Spearhead's written consent must, therefore, be obtained before any repairs are carried out or parts replaced. Use of non-Spearhead parts automatically invalidates the Spearhead Warranty. Failed components must not be dismantled except as specifically authorised by Spearhead and dismantling of any components without authorisation from Spearhead will invalidate this warranty.
- 9 All warranty claims must be submitted to Spearhead on Spearhead Warranty Claim Forms within 30 days of completion of warranty work.

Extended Warranty

As an extension to the 12 month warranty set out above, Spearhead will provide an additional 12 month warranty cover subject to the Spearhead Warranty Conditions above and the Extended Warranty Conditions below.

Extended Warranty Conditions

- 1 The extended warranty applies to hydraulic pumps, motors, valves and gearboxes only. It does not apply to other parts, to consumables such as lubricants, seals or filters or to labour charges.
- 2 The machinery must have had an annual service carried out by an Authorised Spearhead Dealer or a Spearhead Service Engineer within 1 month of the first anniversary of the date of sale and the Service Report form must have been completed and stamped by the servicing dealer or Spearhead Service Engineer and sent to Spearhead within 14 days after the first annual service.
- 3 The extended warranty does not cover costs of transportation of the machinery to or from the dealer or Spearhead or the call out costs or travelling expenses of on-site visits.

Transfer of Warranty

The Spearhead warranty may be transferred to a subsequent owner of the machinery (for use within the UK) for the balance of the warranty period subject to all of the warranty conditions and provided that the Change of Owner form is completed and sent to Spearhead within 14 days of change of ownership.

Spearhead reserves the right to make alterations and improvements to any machinery without notification and without obligation to do so.