TMG INDUSTRIAL®

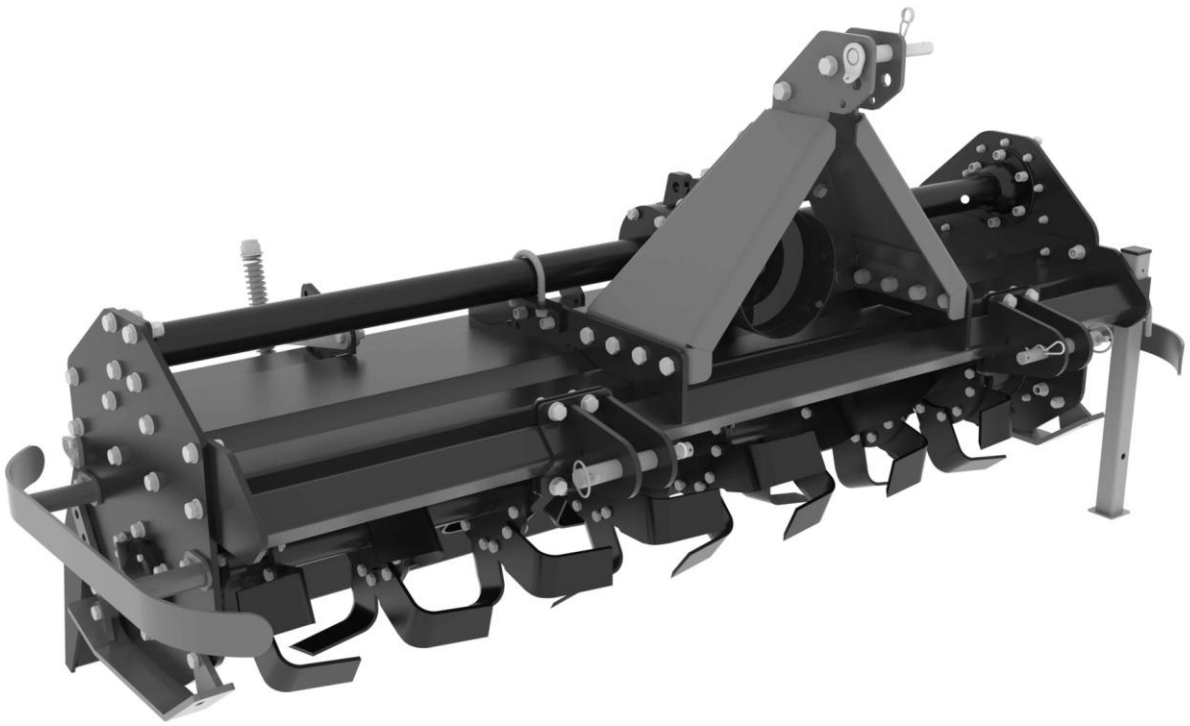
TMG-RT175

PRODUCT MANUAL

v.2023.7.9

70" TRACTOR ROTARY TILLER

Gear Driven,3-PTO Driveline Shaft Included



⚠ WARNING

- **Please read and understand the product manual completely before assembly**
- **Check against the parts list to make sure all parts are received**
- **Wear proper safety goggles or other protective gears while in assembly**
- Do not return the product to dealer. They are not equipped to handle your requests.

Missing parts or have questions on assembly?
Please call: 1-877-761-2819 or email: cs@tmgindustrial.com

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SAFETY INFORMATION

Safety at all times

Thoroughly read and understand the instructions given in this manual before operation. Refer to the “Safety Decal”, read all instructions noted on them.

- Operator should be familiar with all functions of the unit.
- Operate implement from the driver’s seat only.
- Make sure all guards and shields are in place and secured before operating the implement.
- Do not leave tractor or implement unattended with engine running.
- Dismounting from a moving tractor could cause serious injury or death.
- Do not stand between tractors and implement during hitching.
- Keep hands, feet, and clothing away from power-driven parts.
- Wear snug fitting clothing to avoid entanglement with moving parts.
- Watch out for wires, trees, etc., when raising implement. Make sure all persons are clear of working area.
- Turning tractor too tight may cause implement to ride up on wheels. This could result in injury or equipment damage.

BE AWARE OF SIGNAL WORDS

A signal word designates a degree or level of hazard seriousness. The signal words are:

DANGER

Indicates an imminently hazardous situation which, if not avoids, will result in death or serious injury. This signal word is limited to the most extreme situations, typically for machine components that, for functional purpose, cannot be guarded.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

For you protection

- Thoroughly read and understand the “safety label” section, read all instructions noted on them.
- Shutdown and storage
- Lower machine to ground, put tractor in park, turn off engine, and remove the ignition key.
- Detach and store implements in a area where children normally do not play. Secure implement by using blocks and supports.

Use safety lights and devices

- Slow moving tractors, self-propelled equipment, and towed implements can create a hazard when driven on public roads. They are difficult to see, especially at night.
- Flashing warning lights and turn signals are recommended whenever driving on public roads.

Transport machinery safely

- Comply with state and local laws.
- Maximum transport speed for implement is 20 mph. Do not exceed. Never travel at a speed which does not allow adequate control of steering and stopping. Some rough terrain require a slower speed.
- Sudden braking can cause a towed load to swerve and upset. Reduce speed if towed load is not equipped with brakes.
- Do not tow a load that is more than double the weight of tractor.

Keep riders off machinery

- Riders instruct of operator's view, they could be struck by foreign objects or thrown from the machine.
- Never allow children to operate equipment.

Practice safe maintenance

- Understand procedure before doing work. Use proper tools and equipment.
- Work in a clean dry area.
- Lower the implement to the ground, put tractor in park, turn off engine, and remove key before performing maintenance.
- Allow implement to cool completely.
- Do not grease or oil implement while it is operation.
- Inspect all parts. Make sure parts are in good condition and installed properly.
- Remove buildup of grease, oil or debris.
- Remove all tools and unused parts from implement before operation.

Prepare for emergencies

- Be prepared if a fire starts.
- Keep a fist aid kit and fire extinguisher handy.
- Keep emergency numbers for doctor, ambulance, hospital and fire department near phone.

Wear protective equipment

- Protective clothing and equipment should be worn.
- Wear clothing and equipment appropriate for the job. Avoid loose fitting clothing.
- Prolonged exposure to loud noise can cause hearing impairment or hearing loss. Wear suitable hearing protection such as earmuffs or earplugs.
- Operating equipment safely requires the full attention of the operator. Avoid wearing radio headphones while operating machinery.

Avoid high pressure fluids hazard

- Escaping fluid under pressure can penetrate the skin causing serious injury.
- Avoid the hazard by relieving pressure before disconnecting hydraulic lines.
- Use a piece of paper or cardboard, not body parts, to check for suspected leaks. Wear protective gloves and safe glasses or goggles when working with hydraulic systems.
- If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be treated within a few hours or gangrene may result.

STRUCTURE AND THEIR ADJUSTMENT

These series rotary tillers are tillage equipment by means of the compound motion both of the rotation of the blade and the tractor going forward. Each rotary consists of transmission sets and working parts. Transmission sets include drive line, gearbox, side gearbox. Working parts include blade and blade shaft. Headstock, the cover and trailing bar are assistant sets.

SPECIFICATION

These series rotary tiller, are driven by the power-take-off of tractor. It is a kind of excellent equipment for primary and secondary tillage. It can match with 35-55HP wheel-tractor, working on unplowed and plowed field, surface soil smooth, good coverage with weed and stubble, working depth uniform, efficiency high. It can get the results of multi-ply plowing by one times tilling. It is suitable for plowing in dry field and paddy field in the area of producing wheat and rice. Being adopted helical bevel gears meshing for main shift gears in the gearbox, whole structure , whole cover and forced trailing bar ,they are good rigidity , stable operation , low noise , high efficiency , low oil consume and easy to maintain ,etc.

MODEL	TMG-RT175
Dimensions(mm)	2060*925*1020
Structure Weight(kg)	395
Tilling width(mm)	1750
Tilling height(mm)	100-150
PTO turning speed(rpm)	540
PTO shaft size(mm)	General shaft T5-800,Slip clutch, shear bolt for optional
Power Required(hp)	35-55
Packing Size(mm)	2170*720*770

DRIVELINE ASSEMBLY

The driveline consists of universal joint head, universal joint head for male shaft, the universal joint head for female shaft and joint cross. there are rings on the both ends of joint cross to avoid the movement of joint cross, and there is also a grease hole on the joint cross and the needle bearing can be well lubricated if you inject grease into it frequently. The universal joint head for male shaft and the universal joint head for female shaft are sliding joint and it can be pulled back and forth freely when the rotary tiller rises or falls. It must be noted that the interval between socket and shaft is in the shortest situation but the socket and the shaft cannot contact each other during operating, and if the interval between the socket and the shaft is in the biggest situation, the overlap of socket and shaft must be longer or equal to the 1/2 length of the shaft.

HEADSTOCK

The upper hitch point on the headstock must be connected with the control link of the tractor and the lower coupling pin of headstock must be connected with the tension link of the tractor to make the rotary tiller form the stable three-point hitch linkage.

CENTRAL GEARBOX ASSEMBLY

The central gearbox assembly consists of gearbox front cap, rear cap, first shaft, second shaft and a helical bevel gear pair that transmits the power to side gearbox. There is an oil hole for adding oil on the top of the gearbox. And there is a plug for draining oil at the bottom of the gearbox. The helical bevel gear is splined matches the shaft .The gears are tightened with elastic collar, washer and lock nut to prevent axial moving.

In using, the bearing clearance and the gear backlash will be changed because of wearing of bearings and gears, so you must adjust them (if necessary).

Adjustment of helical bevel gear backlash:

A proper backlash is the one of the condition for working normally. If the backlash is too large, it will result in the strong collision and loud noise.

Precaution:

Helical bevel gear backlash must be adjusted after the clearance of bearing on the first shaft has been adjusted. For retaining the clearance of bearing in which have been adjusted, for pinion, the total thickness of adjusted shims of the front and the hind bearing seat on the first shaft must keep up. For example, when moving the pinion forward, the decrease –the adjusted shims of the hind –bearing seat on the first shaft must be added to the front bearing seat on the first shaft, vice versa. For large helical bevel gear, when moving it rightward, you must decrease the shims of the bearing seat of the large bevel gear.

In general, just move the pinion forward when you do it. Adjustment of the bearing axial clearance on the second shaft when the axial displacement was occurred very distinctly on the second shaft, you must adjust it in time as following steps: first, loosen washer and screw down the lock nut, then adjusts the displacement of the bearing on the second shaft until there was no distinct axial movement and easy to rotate the shaft.

Finally, lock the jam nut with the washer. This prevents the bearing from loosing.

SIDE GEARBOX ASSEMBLY

The side gearbox consists of side gearbox, three shafts and left side plate assembly.

RIGHT SIDE PLATE ASSEMBLY

The right side plate assembly consists of right side plate, right head of cultivator shaft, right side bearing and bearing seat.

COVER ASSEMBLY

A specific purpose of the cover is warding off clod, safeguarding the driver and still farther breaking the clod.

When rotary tiller is working, if the gap between the blade edge and the cover is too large ,the clod would be thrown to the front of the cultivator shaft, so that it will be cultivated once more, therefore the power of the tractor will be wasted; if the gap is too small, it is easy to congest, recommend gap is 30-45 mm.

CULTIVATOR SHAFT ASSEMBLY

The cultivator shaft assembly consists of cultivator shaft, blade disc and blade.

TRAILING BAR

The function of the trailing bar is still farther breaking the clod and flatting the cultivated land. It was connected with cover. You can obtain different effect of land surface by adjusting the height of the trailing bar. In general, if the soil is dry, to set lower, if the soil is wet, to set higher. When you remove the mud and the weed on the cultivator shaft, assemble the blades, long-distance transport; you should set the bar at the highest.

METHODS OF OPERATING

Installation of headstock with the main body

Before being put in the container, the equipment is parted with the main body. Simply to fix it on the main body with the bolts in the affix pouch. Pay attention to fitting the spring washers on the bolts, and fastening them firmly.

THE METHODS OF BLADE MOUNTING

To meet the requirement of agricultural technique, the blades are adopted different fixing methods, so that a variety of tillage effects can be gotten. Blades should avoid mounting in reverse and making the back of the blades enter into soil, the parts will be damaged because of overload.

The left-bent blades and the right-bent blades work in a stagger state on whole blade shaft. Only a blade enters into soil at the same time. this arrangement is suitable to flat plowing, so the blade shaft operates stable; the surface of plowed field is smooth. To extend the application scope, every type of rotary tillers has tow sort of blade arrangement. Please take a strictly attention to mounting the blades according to the mark on the blade discs.

CONNECTING WITH THE THREE-POINT LINKAGE OF TRACTOR

The connecting way of rotary tiller with the tractor is three-point linkage. The steps are as follows:

1. Align the center of headstock by reversing the tractor, raise the link arm to appropriate height, reverse the tractor to make the link arm of tractor joint with the left and right pin of rotary tiller.
2. First install the left lower linkage arm, then install right lower linkage arm, (because the leveling lift rod has screw that can be adjusted length) finally insert the pins.
3. Install the upper linkage arm, and then insert the pin.
4. Mount the driveline, and then insert the pins, poke the cotter pin. It must be taken attention to mounting ord er of the universal coupling.

ADJUSTMENT BEFORE WORKING

1. Adjustment of horizontal level

Put it down to make the blade tips near the ground, observe that the height between the right and left blade tips and the ground is same or not. If not, it is necessary that the right linkage arm of tractor be adjusted to level off the blade shaft, which ensures the uniformity of working depth.

2. Adjustment of longitudinal level

Fall the tiller to tillage depth desired, observe that universal coupling and PTO shaft are level or not.

If the angle of universal coupling is too large, adjust the control link to make it nearly level, which can maintain that universal coupling and the tiller work in the good condition.

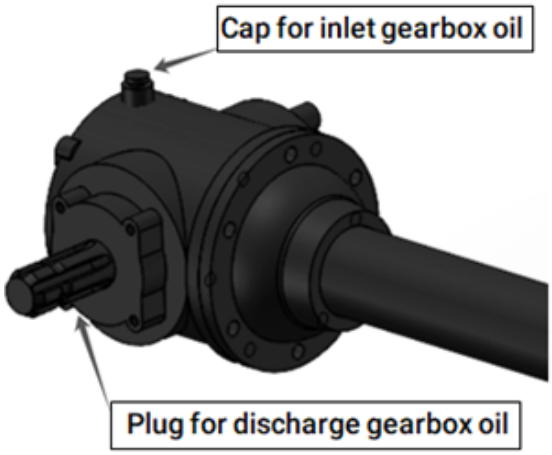
CULTIVATING ROUTE

When working in a piece of larger land, in land plowing is adopted to reduce the empty time in turn land, to raise work efficiency. The width of the plot selected is whole number multiple of the working width or near as possible, so as to decrease repeat tilling. The width of the plot is commonly 15m or so, if too wide, the empty time in turn land will be longer, the efficiency be less, the repeat times of idle motion be more, the mud depth be longer. The flat tillage in the medium and small fields refer to the in land plowing.

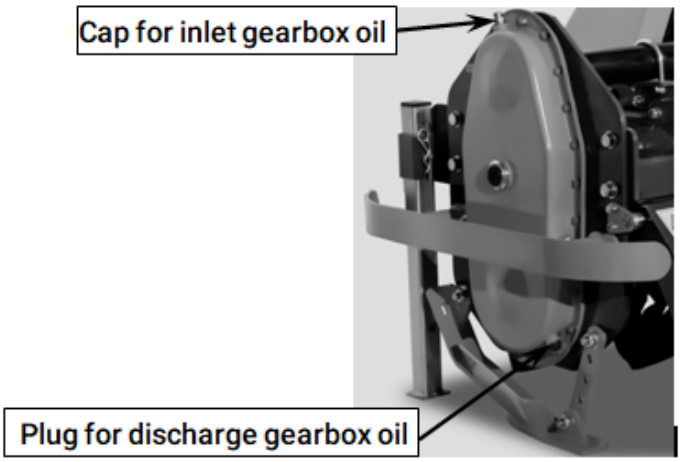
STARTING OF THE TILLER

First, filling with gear oil in the gearbox and the side chain box, injecting grease to the crosshead and the bearing seat of the blade shaft. Then check for the looseness of all connecting bolts and nuts, if loosing, fastening it at once. If the crack and deforming are found in the blades, they must be replaced.

Add (0.8L-0.9L) gear oil to the gearbox



Add (1.5L-1.6L) gear oil to the side gearbox



Starting tractor: rise the tiller and the blade tip must be away from ground 150mm-200mm, and joint universal coupling, then run in 1-2 minutes, gear the operating gear position and increase the fuel throttle, control the leveling handle to make the tiller enter into the soil gradually until the normal tillage depth at the same time.

SELECTING OF FORWARD SPEED

The selecting principle of tiller forward speed: the tractor cannot overload constantly; the performance of breaking soil meet the needs of agriculture requirement, furrow bottom and the soil surface are smooth. Not only be tillage quality ensured, but also the rated power of tractor be made good use of, and the purpose of rising work efficiency must be attained.

Generally, rotary tilling directly: 2km/h-5km/h, harrowing: 5km/h-7km/h; if the unit draft of the soil is bigger, can select lower gear; contrarily select higher gear; when working in dry fields, select lower gear; when working in paddy fields, select higher gear.

OPERATING OF HEADSTOCK

1) Using position control when the tiller works. The handle of draft control must be put in the position marked ”up”.

2) When the handle of position control moves forward, the tiller fall down; contrarily the tiller rise.

3) After the tiller reaching to required depth, using the position hand-wheel to block it, in favor of that the tiller falls the same depth every time.

4) The details refer to the instruction of matching tractor.

DRIVELINE DIMENSION

A PTO driveline is supplied with the machine. To ac-company the variety of 3 point hitch geometry available today, the driveline can be too long for most machines or too short for others. It is very important that the drive- line be free to telescope but not to bottom out when going through its working range. If the driveline bottoms out, the bearings on both the machine and tractor PTO shaft will be overloaded and fail in a short time.

1. To determine the proper length of the driveline, follow this procedure:

a. Clear the area of bystanders, especially small children.

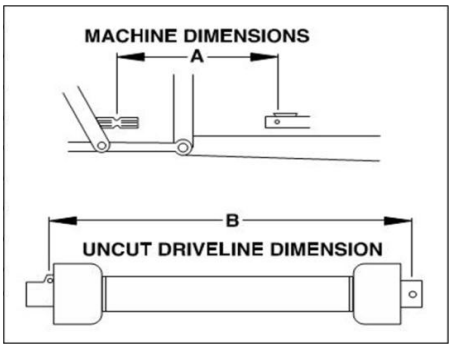
b. Attach the chipper to the tractor, but do not attach the driveline.

c. Raise the machine until the input shaft is level with the tractor PTO shaft.

d. Measure the dimension between the locking grooves on the tractor PTO shaft and the machine input shaft.

e. Measure the same dimensions on the compressed driveline.

f. If the compressed driveline dimension exceeds the machine dimension, the driveline will have to be cut.



2. When cutting the driveline, follow this procedure:

a. Subtract the machine dimension (A) from the uncut driveline dimension (B) or (B-A). This dimension determines how much too long the driveline is.

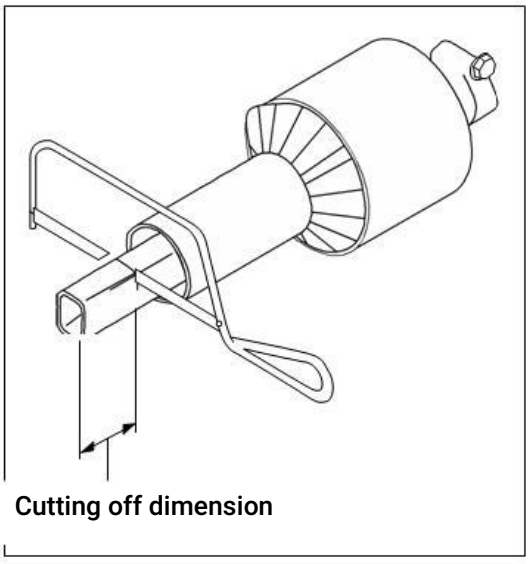
b. Add another inch (25 mm) to the dimension to be sure it doesn't bottom out, to determine (C) the cut off dimension.

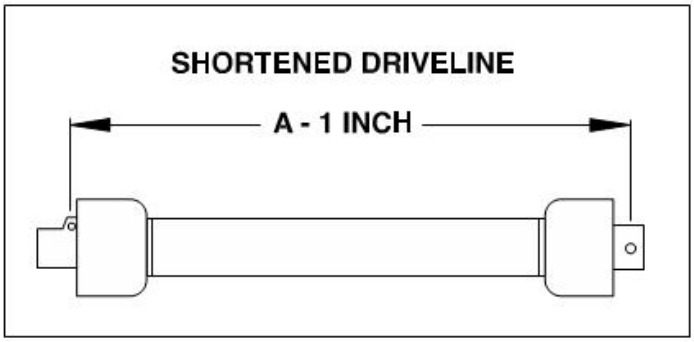
c. Use a hacksaw to cut dimension (C) from both ends. Cut both the plastic tubes and the metal cores.

d. Use a file to remove the burrs from the edges that were cut.

e. Assemble the 2 ends of the shaft.

f. Make sure the shaft can telescope freely. If it does not, separate the 2 parts and inspect for burrs or cuttings on the shaft ends. Be sure it telescopes freely before installing.


Cutting off dimension



MAINTENANCE

To ensure that the tiller woks properly, higher efficiency and prolonging the serve life, it is important that maintenance must be done properly.

Daily maintenance (after 10 hours operating)

1. Check, tighten up all of the joint bolts and nuts, tighten them up or replace them if necessary.

2. Check the lubricant oil in the gearbox and the side gearbox, keep the oil level desired.

3. Check universal joint cross, pin, grease cup on the bearing seat, inject grease into the cup.

4. Check the blades to see if the blades are disable and their fasten bolts are loose, should replace or tighten them if necessary.

5. Check the tension of chain; adjust it if necessary.

Season maintenance (after one season operating)

Besides performing the proceeding of daily maintenance, the following must be done also:

1. Replace lubricating oil. It can be done in advance or delayed if necessary.

2. Check universal joint cross. If it is seriously worm, replace it.

3. Check the bearings in the both ends of the blade shaft to see if turbid water enter it because of the faults of oil seals. Disassemble it to clean, replace the oil seals and inject enough grease.

4. Check all bearings; adjust or replace them if necessary.

5. Check helical bevel gears; adjust them if necessary.

Yearly maintenance (after one year operating)

1. Remove all dust and filth away from the tiller.

2. Drain out gear oil and disassemble the tiller to check on. If bearings be worn seriously or go wrong, it must be replaced; the parts must be cleaned before assembled. Final, add new oil to standard oil level.

3. Disassemble and clean the bearings and their seat of blade shaft, replace the oil seals and inject enough grease.

4. Disassemble and clean the universal joint cross assembly, and clean the roller pins of the universal joint, replace them if necessary.

5. Check the fastener and the cotter pins, etc. If the part is rusty or worn seriously, or the disable, it must be replaced.

6. Check the blades to see if there is crack, wear and tear on them, or loss. It must be replaced or added if necessary. 7. Check the blade holder, replace or repair them if necessary.

8. Repair the cover and the trailing bar.

9. The rotary tiller must be placed indoor as possible during it parks, and be raised to make the blade tips leave the ground. The blades and processing surface revealed must smeared oil to prevent from rusty. The surface in which the paint broken off must be painted with the primitive colors to prevent from rusty.

LUBRICATION SITES

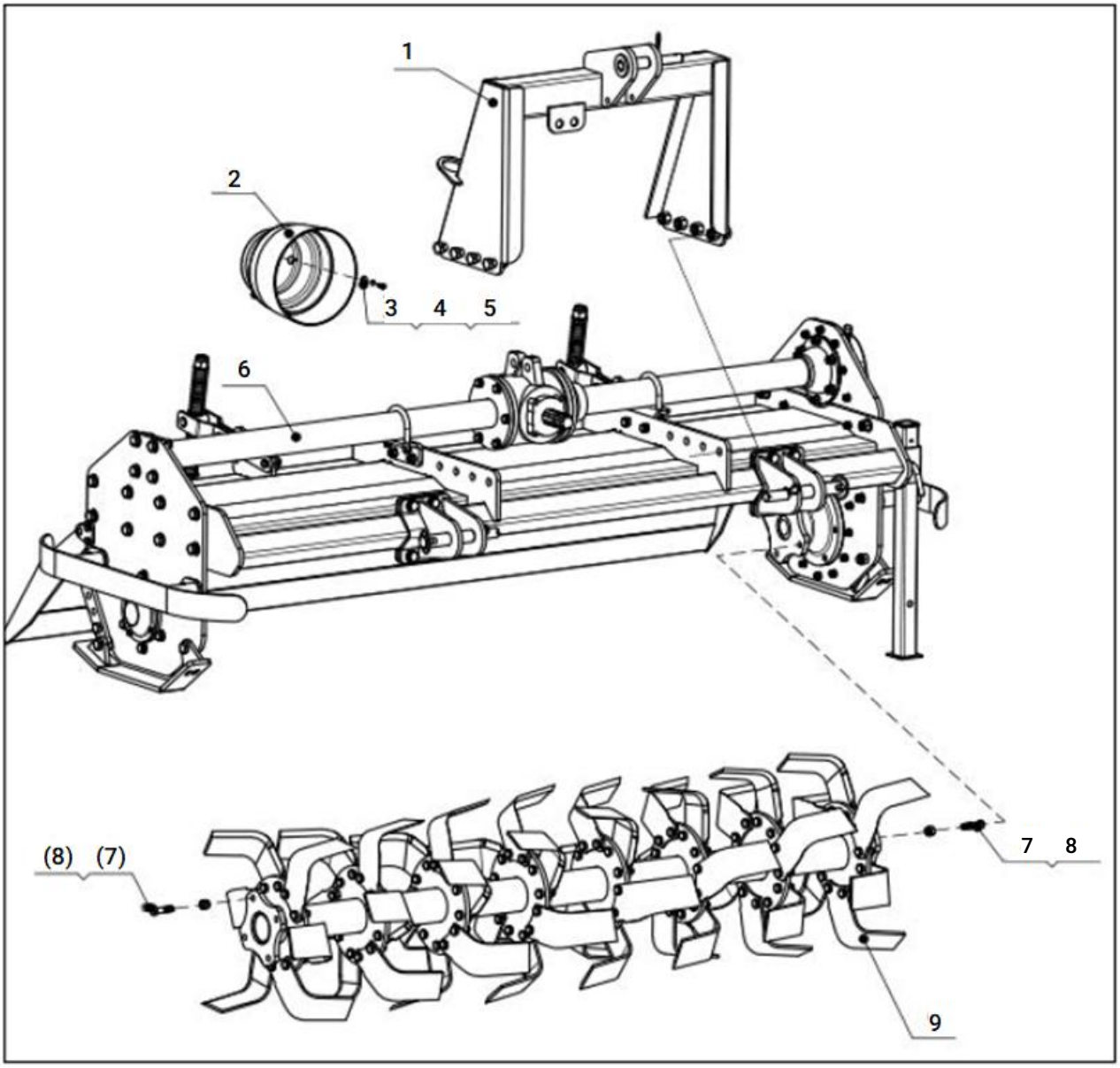
Lubrication sites	Purpose
Oil check screw plug	Check the oil level of the gearbox and the side gearbox(injection should continue until oil overflows out from the oil check hole).
Ventilate screw plug	Ventilation of the side gearbox
Grease cup of the joint cross	Inject the grease into the joint cross (so that lubricate the roller needle Of the joint cross)
Grease cup of the bearing seal on the cultivator shaft	Inject the grease into the bearing and the oil seals of the cultivator Shaft(lubricate the bearings and the oil seals)

TROUBLE SHOUTING

Problem	Cause	Solution
Universal coupling inclined too much	Rotary tiller failed horizontal Level	Adjust the horizontal level of The tiller
	One side sway chain of tractor is too short	Adjust the chain
Universal coupling injured	Direction mistaken	Re-assemble correctly
	Grease deficient	Rinse and inject grease Sufficiently
	Angle of universal coupling is Too big or is gripped	Limit the rising position and re-lock the position
	Rotary tiller fallen down the soil sharply	Fall the tiller down the soil smoothly
Noise in gearbox	The clearance between the two helical bevel gears is too large	Adjust this clearance
	Bearing injured	Replace bearing
	Tooth of gear broken	Replace gear
Trouble rotation of cultivator shaft	Gear or bearing injured or gripped	Replace gear or bearing
	There was no clearance between the two helical bevel gears	Adjust the clearance of the helical bevel gear pair
	Out of shape of left side plane	Correct side plane
	Cultivator shaft crooked or out of shape	Correct or replace cultivator shaft
Noise in side chain box Blade slot injured	Cultivator shaft crooked or out of shape	Clear away grass or soil
	Cultivator shaft twined with grass or hold soil seriously	Clear away the stone from the field
	Blade run foul of stone so that it suffers too much force	Assemble the blades correctly
Trouble rotation of cultivator shaft Blades crooked or broken	Blade assembled on opposite direction so that it suffers too much force	Fall the tiller down the soil smoothly
	Rotary tiller fallen down the soil sharply so that it suffers too much force	Replace the blades and clear away The stones from the field
	Blades run foul of stone	Rise the tiller and do not plough when the tractor turns a corner in the field
	Doing plough when tractor turns a corner in the field	Fall the tiller down smoothly

PARTS ILLUSTRATIONS

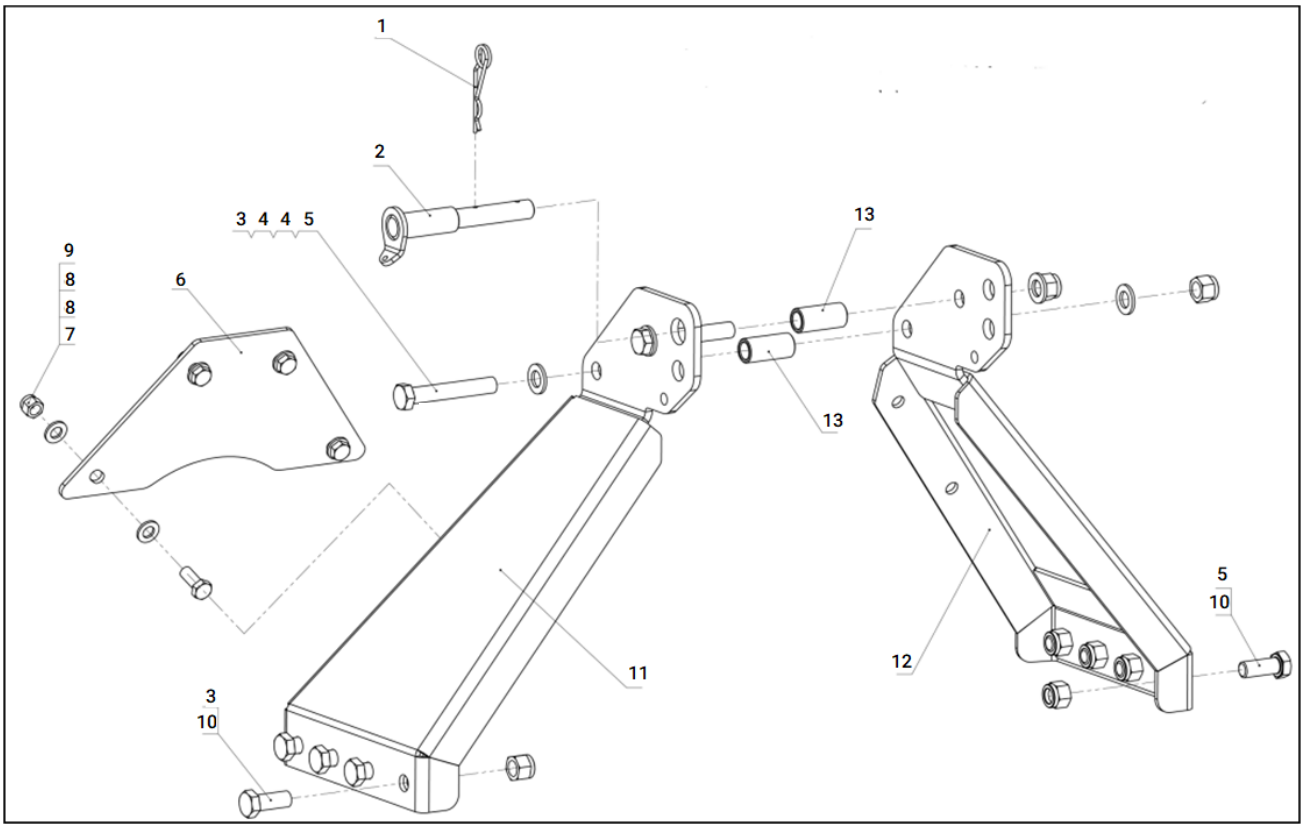
Rotary Tiller Transmission Assembly



Rotary cultivator assembly

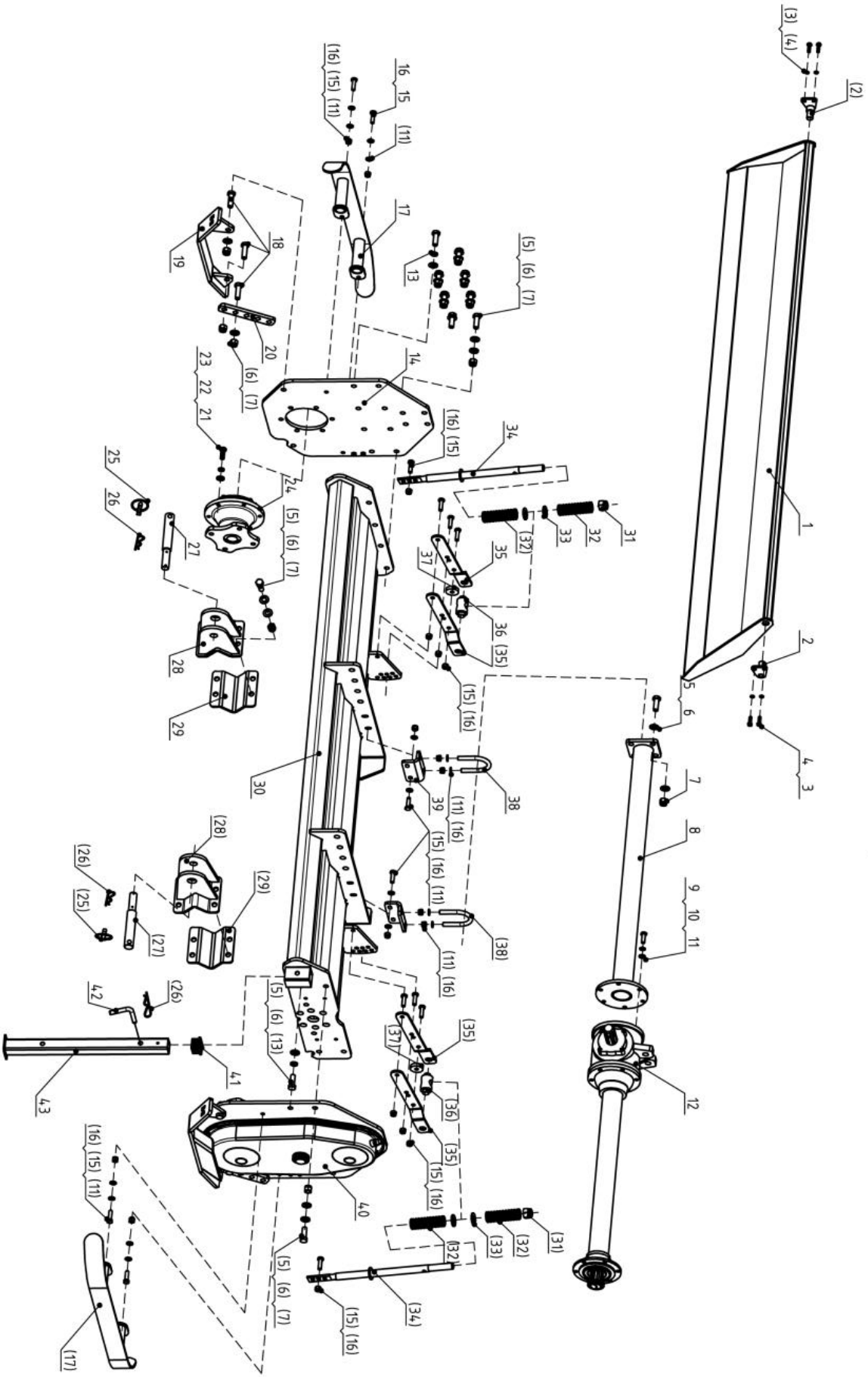
No.	Name & Specification	QTY
1	Lifting Assembly	1
2	PTO shielding	1
3	Bolt M8x16	4
4	Spring lock washers 8	4
5	Large Plain washers 8	4
6	Frame Assembly	1
7	Bolt M12*45	8
8	Lock nut M12	8
9	Rotor Assembly	1

① Lifting Assembly



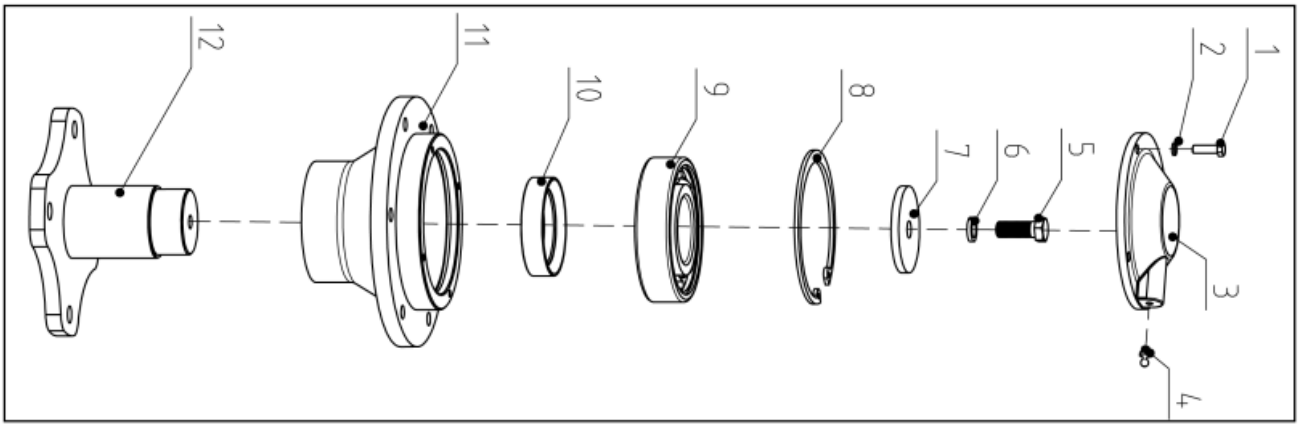
No.	Name & Specification	QTY
1	R pin 3	1
2	Upper hitch pin	1
3	Lock nut M16	10
4	Washer 16	4
5	Bolt M16x100	2
6	Hitch rear reinforcement plate	1
7	Lock nut M12	4
8	Washer 12	8
9	Bolt M12x30	4
10	Bolt M16x40	8
11	Left hitch welder	1
12	Right hitch welder	1
13	Hitch sleeves	2

⑥ Frame Assembly



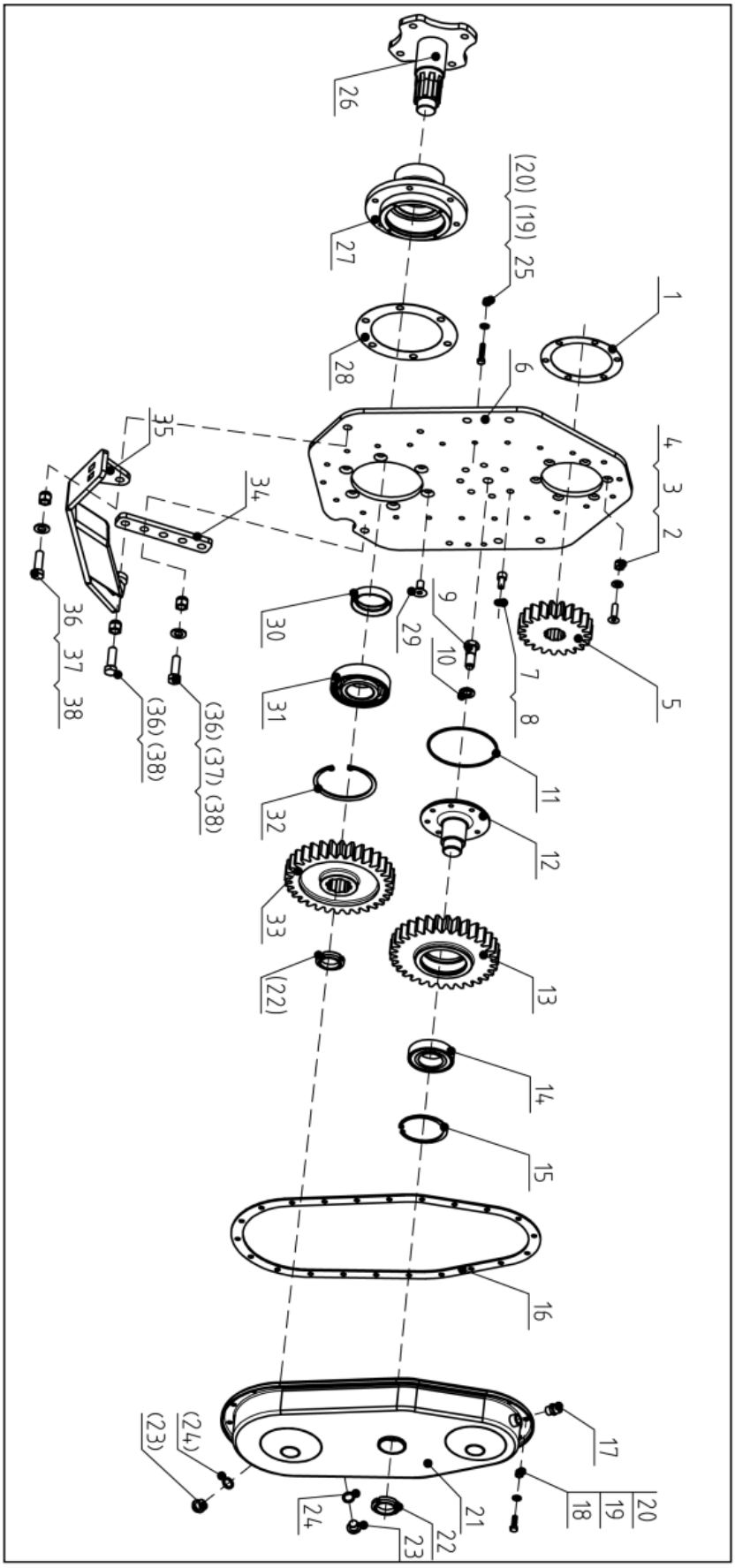
No.	Name & Specification	QTY
1	Dragging plate welded	1
2	Apron pin	2
3	Bolt M8X30	4
4	Spring lock washer 8	4
5	Bolt M14X40	24
6	Plain washer 14	47
7	Lock nut M14	24
8	Right support tube welding	1
9	Bolt M10X30	6
10	Spring lock washer 10	6
11	Plain washer 10	26
12	Gearbox assembly	1
13	Spring lock washer 14	4
14	The right side of the plate welded	1
15	Bolt M10X35	16
16	Lock nut M10	20
17	Outer protective frame welded	2
18	Bolt M14X45	3
19	Right tillage depth limit welded	1
20	Adjust plate	1
21	Bolt M12X30	6
22	Spring lock washer 12	6
23	Plain washer 12	6
24	End bearing	1
25	Lock pin p12	2
26	R pin 3x70	3
27	The suspension pin	2
28	Before hanging front pressure plate weld	2
29	Under hang the back plate	2
30	Roof cover	1
31	Lock nut M20	2
32	Spring	4
33	Plain washer 20	3
34	Rocker welded	2
35	Back cover rocker arm	4
36	The pendulum block back cover	2
37	Dottle pin	2
38	U-bolt 12x63	2
39	Gearbox stand	2
40	The side transmission gearbox assembly	1
41	Pipe plug 41*41	1
42	L pin	1
43	Support welding parts	1

⑥ -(24) End bearing



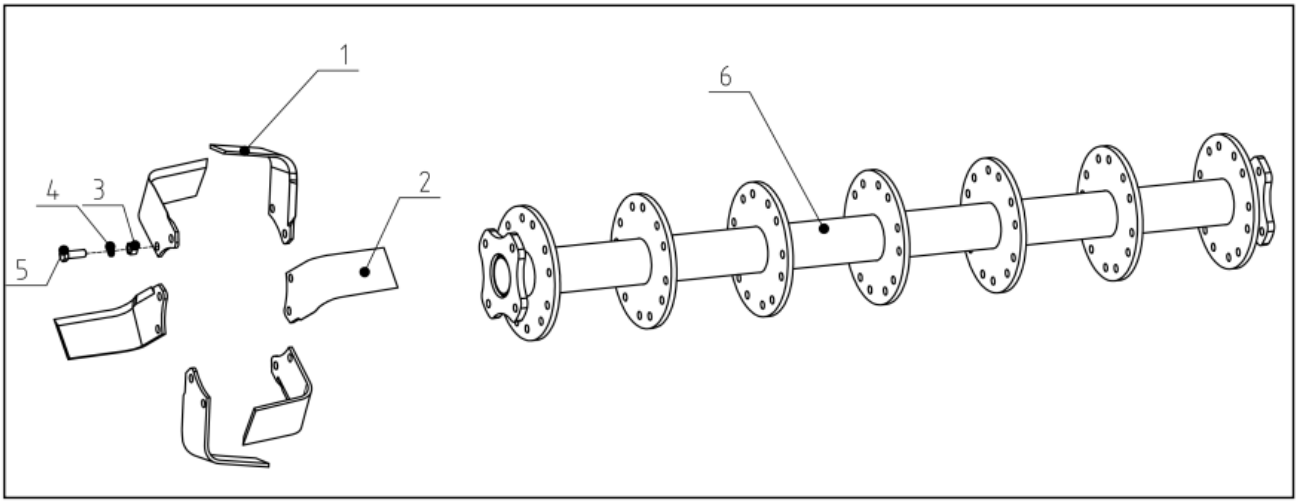
No.	Name & Specification	QTY
1	Bolt M6X20	4
2	Spring lock washer 6	4
3	Roof cover	1
4	Oil cup M6	1
5	Bolt M12x25	1
6	Spring lock washer 12	1
7	Gasket	1
8	Cir clip for hole 110	1
9	Deep groove ball bearing 6310-RZ	1
10	Oil seal 55X75X12	1
11	Bearing block	1
12	Right half shaft welded	1

⑥ -(40) The side transmission gearbox assembly



No.	Name & Specification	QTY
1	Side pods paper pad	1
2	Hex head screws M10x35	6
3	Plain washer 10	6
4	Lock nut M10	6
5	Driving gear	1
6	Left plate welding	1
7	Hexagon socket head cap screws M10x20	7
8	Spring lock washer 10	7
9	Bolt M16x45	1
10	Spring lock washer 16	1
11	O-ring 122x3.55	1
12	Intermediate gear shaft	1
13	Intermediate gear	1
14	Bearing 6209-2Z	1
15	Cir clips for holes 85	1
16	Gear cover gasket	1
17	Air plug M16x1.5	1
18	Bolt M8x25	18
19	Plain washer 8	22
20	Lock nut M8	1
21	Gear cover welding	2
22	Lock nut M35x1.5	2
23	Plug M16x1.5	2
24	Composite gasket M16x1.5	4
25	Bolt M8x35	1
26	The left half is welded together	1
27	Bearing block	1
28	Bearing seat gasket	6
29	Hex head screws M12x25	1
30	Oil seal FB55X75X12	1
31	Deep groove ball bearing	1
32	Cir clips for holes 110	1
33	driven gear	1
34	Plough plate	1
35	The left tillage limit welding	1
36	Bolt M14x45	3
37	Plain washer 14	2
38	Lock nut M14	3

⑨ Rotor Assembly



No.	Name & Specification	QTY
1	Right blade	24
2	Left blade	24
3	Nut M12x1.25	96
4	Spring lock washer 12	96
5	Bolt M12x1.25x35	96
6	Knife shaft welding parts	1