

Model FC1&FC1A
Site Dumper

Operation Manual

Preface

Model FC1&FC1A dumper, a diesel-powered car with forward tipping skip, is commonly used in many branches for short or medium transportation, such as in construction, roadbuilding, mine, water conservancy, and other industry and agriculture, particularly suitable for conveying concrete, stone, sand, soil, ore, grain, fertilizer and other bulk materials.

The features of Model FC1&FC1A dumper is its compact construction, light operation, maneuverable steering, economical and reliable service, easy maintenance, as well as self-dumping and self-righting. In addition, the dumper is equipped with electric lighting system for night operation.

Proper operation and service are essential to prolong life and satisfactory performance of a Dumper. This manual provides operating instruction and information concerning lubrication and service as required for more efficient use of this dumper. A separate manual is furnished for the engine of this dumper. Be familiar with the instructions in both manuals before attempting to operate the engine and the dumper.

Important Instructions

1. New dumper should go through with running-in process accordingly before taking up loads for normal operation, otherwise its service life will be shortened.
2. Fuel of specified grade is to be used, and before being poured into the fuel tank, it should be sufficiently precipitated and thoroughly filtered.
3. Never drive the dumper down a slope at high speed.
4. Never make a sharp turn at high speed.

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Chapter 1 Main Specifications

A. General

1. Model	FC1&FC1A
2. Overall dimensions	
Length	2650 mm
Width	1600 mm
Height(to steering wheel)	1450 mm(FC1)
(to roof)	2074 mm(FC1A)
3. Skip capacity	
Water level	317 litres
Struck level	467 litres
Heaped	765 litres
4. Unloaded weight	1100 kg
(with fuel, oil and water)	
5. Payload	1000 kg
6. Wheel base	1500 mm
7. Wheel tread Front	1318 mm
Rear	1295 mm
8. Ground clearance	205 mm
9. Minimum turning radius	4 m
10. Traveling speeds	
1 st gear	5.8km/hr
2 nd gear	11.3km/hr
3 rd gear	23km/hr
Reverse	4.7km/hr

B. Engine

(Refer to " Operation Manual for S195N Diesel Engine" for further details)

1. Model	S195N
2. Type	Horizontal, single-cylinder, Four-stroke, radiator water cooled
3. Rated power	8.3 kw
4. Rated Speed	2000 rpm

C. Transmission

1. Clutch Type	Constant-contact, single-disk dry clutch
2. Gearbox type	Selective-gear transmission With three forward speeds and One reverse speed
3. Transmission ratio	
1st gear	3.97
2nd gear	2.04

3rd gear		1
Reverse		4.89
4. Propeller shaft	Open, universal-joint tube With needle bearing	
5. Main drive	Spiral bevel gear	
6. Main drive ratio	6.833	
7. Differential	Bevel gear type	
8. Axle shaft	Semifloating type	
9. Brake	Drum type with mechanical	

D. Wheels and Steering System

1. Frame type		Channal beams welded
2. Front axle		Driving axle
3. Rear axle		Steering axle
4. Tyre sizes		
Front		7.50-16
Rear		5.00-15
5. Tyre inflation pressure		
Front		3.5kg/cm ²
Rear		2.5kg/cm ²
6. Rear wheel alignment		
Toe-in		5-7mm
Kingpin inclination angle		6°
Camber angle		1°
7. Steering-gear	Worm-and-double-roller type	
8. Steering gear ratio (mediate position)		18.15
9. Steering trapezium	Rear-mounted type	

E. Skip and its Locking Mechanism

1. Skip type	V-dump skip
2. Tipping and resetting means	Forward gravity tipping And Spring Return Skip
3. Locking mechanism	Incline-dog lock

F. Electric System (FC1 Nu The System)

1. Earthed pole	Grounded positive pole
2. Line voltage	12 V
3. Battery	
Model	6-QA-75S
Type	Lead-plate type
Level of electrolyte	10-15mm over plates
Rated voltage	12V
Capacity	75AH
4. Dynamo	2JF11

Model	14V
Voltage	200W
Power	
5. Starter	
Model	QD1247AB
Voltage	12V
Power	1.4KW
6. Regulator	
Model	2JF200
Adjustable voltage	13.5-14.5V
Adjustable current	13.8-14.8A
7. Lighting	Two head lamps Two front signal lamps Two turn signal lamps Two tail lamps One instrument lamp

G. Main injection Capacities

1. Fuel tank	9.5 lit
2. Engine cooling system	16 lit
3. Engine lubricating system	2.77 lit
4. Air filter oil pan	0.2 lit
5. Gearbox	1.16 lit
6. Driving axle	2.3 lit
7. Steering gear	0.26 lit

Chapter 2 Operation of Dumper

A. Controls and Instruments

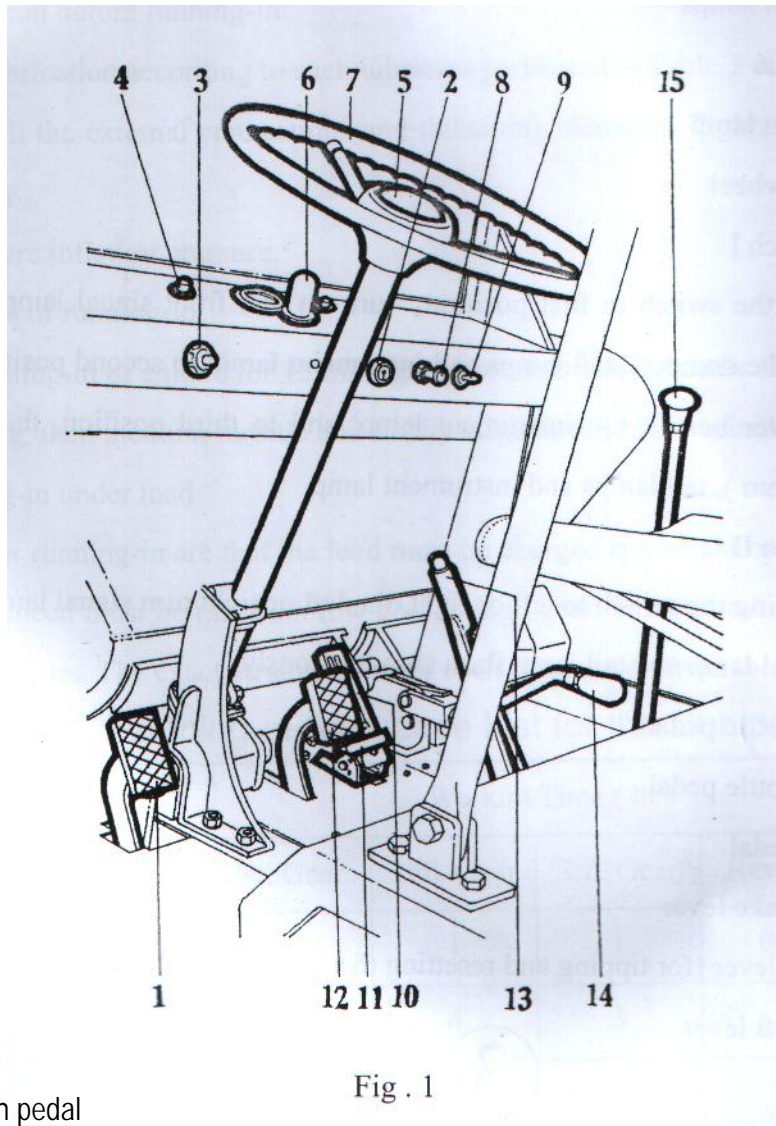


Fig . 1

1. Clutch pedal
Used for the control of clutch. Depressing the pedal, the clutch is disengaged.
2. Main switch
Insert the key into the switch and turn either right or left for closing the circuit.
3. Start button
4. Turn signal lamps
5. Horn button
6. Instrument lamp
7. Steering wheel

8. Light switch I Pull the switch to first position, turn on two front signal lamps (indicating width of the duper), tail lamps and instrument lamp; to second position, the head lamps(lower beam) t-instrument lamp; and to third position, the head lamps(upper beam), tail lamps and instrument lamp.

9..Light switch II

Turning the switch to left or right, the left or right turn signal lamp, front signal lamp and tail lamp flash simultaneously.

10.Foot throttle pedal

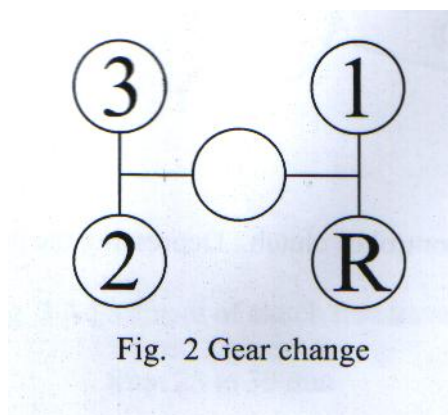
11 Stop throttle pedal

12. Brake pedal

13. Hand brake lever

14. Control lever (for tipping and resetting the skip)

15. Gear shift lever



B. Running-in Process of New Dumper

Before new dumper after overhaul is used, it is necessary to carry out running-in process first.

1. Preparation before running-in;

(1) Make lubrication according to each lubricant part listed in Table 3 of

Chapter 5.

(2) Check all the external connections and tightening elements. Tighten them, if it is necessary.

(3) Check type inflation pressure.

2. Sequence of running-in:

(1) Idle running-in of engine for 15 minutes. It controls small throttle for 5 minutes at beginning, then medium throttle and finally large throttle for 5 minutes.

(2) Running-in under load

Rules for running-in are that the load must be charged from light one to heavy one and the speed must be run from low gear to high gear. Total time for this item will be 30.5 hours. The exact arrangement for each can be seen from the following list:

Table 1. **Running-in Sequence List for the Dumper**

Load	Weight (kg)	Working Time (hr)				Total (hr)
		1st .Gear	2nd .Gear	3rd .Gear	Reverse	
NO Load		1	1	1	0.5	
1/2 Load	500	3	4	3		10
3/4 Load	750	5	6	6		17

Total (hr)	9	11	10	0.5	30.5
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During running-in, observe and listen to the working conditions of engine, transmission system, wheeling and steering system carefully. If any abnormal phenomenon is found, stop the dumper immediately and find the causes to remedy them.

3. Work after running-in:

- (1) Exhaust the lubricant in each body of transmission system and crankcase of engine, when it is heat. Wash and clean them again.
- (2) Make lubrication according to Table 3 of Chapter 5.
- (3) Check all the parts of dumper thoroughly. If it is necessary, carry out adjustments and remedies.

C. Operation

1. Starting of the engine

a. Preparations for starting the engine

- (1) Check the dumper according to the shift maintenance.
- (2) Set the gear shift lever to neutral position.

b. Normal starting

- (1) Insert the key into main switch and turn right to close the circuit.
- (2) Depress the foot throttle pedal.
- (3) Depress the start button to close the circuit and the starter motor drives the engine to operate. After the engine has started, the start button should be released immediately. The successive working time of starter motor should not exceed 15 seconds. In case the engine fails to start, release the start after three successive attempts, detect and dispel the trouble before re-starting.
- (4) Release the throttle pedal, run engine at idle speed for 3-5 minutes and then slowly increase the speed of engine gradually, The dumper should not be set going until the engine warms up.

c. Starting the engine in winter

- (1) Fill the cooling system with hot water of 60-80°C, if the engine does not start, fill with hot water repeatedly.
- (2) Fill the crankcase with heated engine oil of 80°C.
- (3) In decompressing state, turn the crankshaft several rounds with starting handle.
- (4) Insert a rolled soft paper into the starting-aid plug. After the rolled paper has ignited, the plug is then screwed into the cylinder head to assist starting.
- (5) Insert the key into the main switch and turn right to start position.
- (6) Depress the clutch pedal, disengage the clutch completely.
- (7) Depress the throttle pedal.
- (8) Pull up the decompressing lever and depress the start button. When starter motor drives the engine at higher speed, push down the decompressing lever immediately, and the engine will be started.
- (9) The dumper will not be set to drive before the engine has warmed up.

d. Under special conditions the engine may be started by starting handle (refer to “starting” in “Operation Manual of Engine”).

2. Driving of the dumper

(1) Depress the clutch pedal and shift to the required gear.

(2) Push the horn button, pay attention to vicinity around.

(3) Release the hand brake lever.

(4) Remove foot slowly from the clutch pedal, at the same time increase the throttle setting progressively to set the dumper going smoothly.

3. Operation

(1) Always set the dumper going with first gear, and change to second or third gear only after the dumper has speed up. Never attempt to set it going with third gear, otherwise the friction plates of clutch may be burned due to overheating.

(2) Disengaging of the clutch should be rapid and engaging of it should be smooth. After the clutch is entirely engaged, the foot should be removed from the pedal at once. When the dumper is running, never adopt the measure of half-engaging clutch to lower the speed.

(3) In case of poor road surface (such as: sand soil road after raining, or melted bituminous road), the driving should be shifted to low gear and violent acceleration has to be avoided as far as possible.

(4) The dumper should be accelerated gradually and avoid depressing the throttle pedal down to bottom suddenly.

(5) Never operate the dumper down a slope with high speed, and that it is strictly prohibited to fast coast down slopes in neutral gear with the dumper in gear and the clutch pedal disengaged. Avoid emergency braking, otherwise the danger of overturning the dumper forward may be occurred.

(6) When the dumper tips material at the edge of a trench, safety obstacles have to be placed.

Off the trench 10 meters, the dumper should be slowed down to the safety obstacles for tipping, otherwise the dumper will run the risk of tipping itself into the trench.

(7) Note the color of exhaust in driving. Often smoking is not to avoid overloading of the engine.

(8) In driving, attention should be paid now and then to observe if the meters and indicators as well as the operating condition and the sound produced by the engine and other components are normal. In case any of them is abnormal, stop the dumper right away to check and remove the troubles.

4. Stopping

a. Stopping of the dumper

(1) Minimize the throttle to lower the speed of dumper.

(2) Depress the clutch pedal, set the gear shift lever to neutral position.

(3) Release the clutch pedal, let the engine run idle at low speed.

(4) The dumper should be braked with hand brake lever when stopping on slope or uneven road to assure a steady parking.

b. Stopping of the engine.

(1) After unloading, let the engine run idle for a while to lower the temperature of oil and water. Never stop the engine at high temperature.

(2) Depress the stop throttle pedal to cut off the oil supply for stopping the engine.

Note:

- (1) If a dumper is to be put out of service in winter, the cooling water must be drained out completely to prevent subsequent cracking of radiator and cylinder due to freezing.
- (2) If the dumper is to be put out of service for a long period, connecting wire of the battery should be taken off. In cold winter, the battery should be taken down and kept in doors.

Chapter 3 Adjustment of Dumper

A. Adjustment of Clutch

1. Adjustment of free travel of the clutch pedal

In order to ensure no slip occurred in clutch when power is transmitted, a definite clearance between throw-out bearing and throw-out lever should be kept. This clearance responds to 25-30 mm free travel of the clutch pedal. In the process of operation, due to the wear of friction plate, the clearance between throw-out bearing and throw-out lever will be diminished or vanished, therefore free travel of the clutch pedal has to be checked and adjusted periodically.

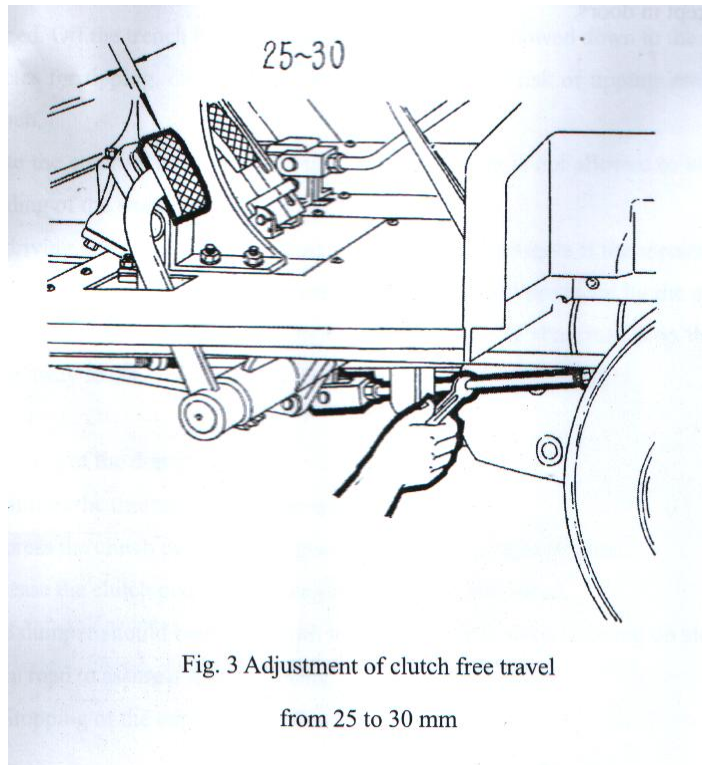


Fig. 3 Adjustment of clutch free travel
from 25 to 30 mm

Fig. 3 Adjustment of clutch free travel from 25 to 30mm

Adjustment clutch free travel is realized by altering the length of the clutch pull rod. By lengthening the clutch pull rod, the free travel of clutch pedal will be decreased and vice versa.(Fig. 3)

2. Adjustment of the position of clutch throw-out lever

On mounting clutch it has to be assured that the distance between lateral surface of clutch

throw-out lever head to the contact surface of driving plate and friction plate is 54mm. The lateral surface of three clutch throw-out lever heads should be in the same plane and their deviations less than 0.15mm, which can be adjusted by rotating the adjusting nut of lever (Fig4). After adjusting, punch such two burrs, that they can just be inserted into the notch of adjusting bolt of lever to prevent loosening.

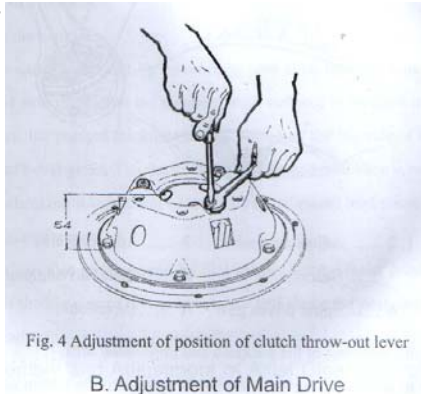
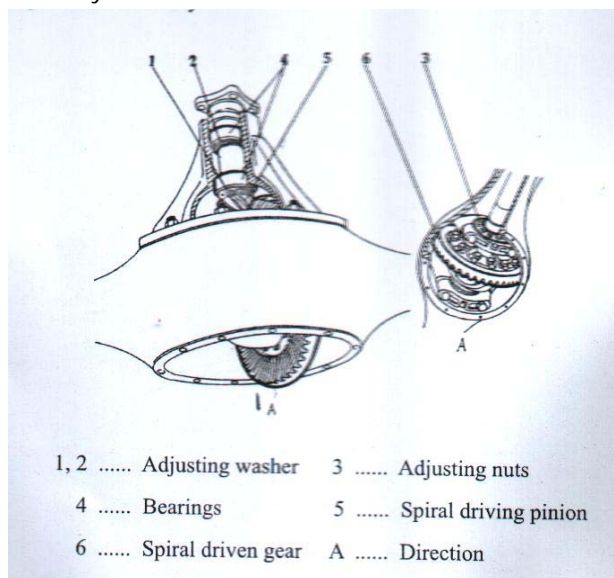


Fig.4 Adjustment of position of clutch throw-out lever
B. Adjustment of Main Drive

The main drive (consisting of a pair of bevel gears, a speed down mechanism of the dumper) transmits large torque in operation. In order to ensure its reliable work, the mounted spiral driven gear must be matched in pair and should not be interchanged.

1. Mounting and adjusting of the spiral bevel driving pinion

When mounting the spiral bevel driving pinion, its two supporting conical bearings should be adjusted with adjusting washer. Increase the thickness of washer, the axial clearance will be decreased. It is required to adjust the axial clearance of two conical bearings will rotate freely.



- 1,2.....Adjusting washer
- 4.....Bearings
- 6.....Spiral driven gear
- 3.....Adjustingnuts
- 5.....Spiral driving pinion
- A.....Direction

2. Checking and adjusting of the backlash and impression area

In order to ensure the correct meshing of spiral driving pinion and driven gear, backlash and impression area of spiral driving pinion should be adjusted the impression

area of spiral driving pinion should be slightly deviated from the middle of the tooth surface to the tip with a length of impression area not less than 40% of tooth height. The correct backlash is 0.15-0.3mm. It can be adjusted by adjusting washer 2 on spiral bevel pinion and adjusting nuts 3 of conical bearings on both ends of differential housing.

(1) Checking the impression area

The impression area can be checked by the method of color painting. In checking, cover a layer of red lead paint on the spiral driven bevel gear and rotate the gears. The print stucked on the spiral driving pinion is then the impression area.

When the dumper goes forward, the concave surface of the driving bevel pinion bears the force, therefore the red lead paint should be spread on the convex surface of the spiral driven bevel gear. When the dumper goes backward, the convex surface bears the force, therefore, on the contrary the red lead paint should be covered on the concave surface.

(2) Checking the backlash

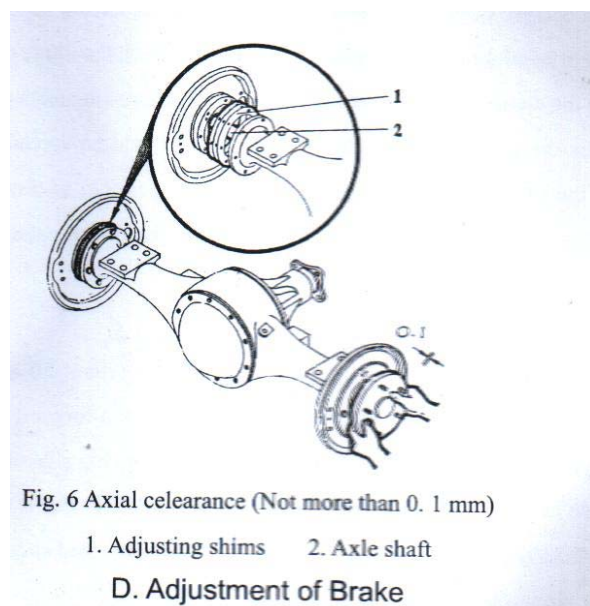
Backlash can be checked by inserting a lead slice (about 50mm long, 5mm wide and 0.5-1mm thick) into the meshing teeth surface in forward traveling. After rotate the gears, the pressed thickness of lead slice near the big side of the teeth is just the backlash of bevel gears. The thickness of the pressed lead slice is measured with a calibrater. In checking it is optimal to insert three (or more) lead slice evenly spaced on the gear circumference.

Backlash can also be measured by dial gauge. Set the feeler head of dial gauge on the front of the big side of driven bevel gear, the value of backlash can be read off.

C. Assembly and Adjustment of Axial Clearance of Front Axle Shaft

During assembling the axle shaft, not more than 0.1mm axial clearance is to be required for ensuring the normal work of the adjusting shims 1. When decreasing the thickness of the shims, the axial clearance of the axle shaft will be correspondingly decreased, and vice versa. During adjusting. The number of shims on both ends should be ensured to be equal, the difference of their thickness should be not more than 0.5mm (Fig. 6)

The axial clearance of the axle shaft can be measured either by micrometer or by depth gauge.



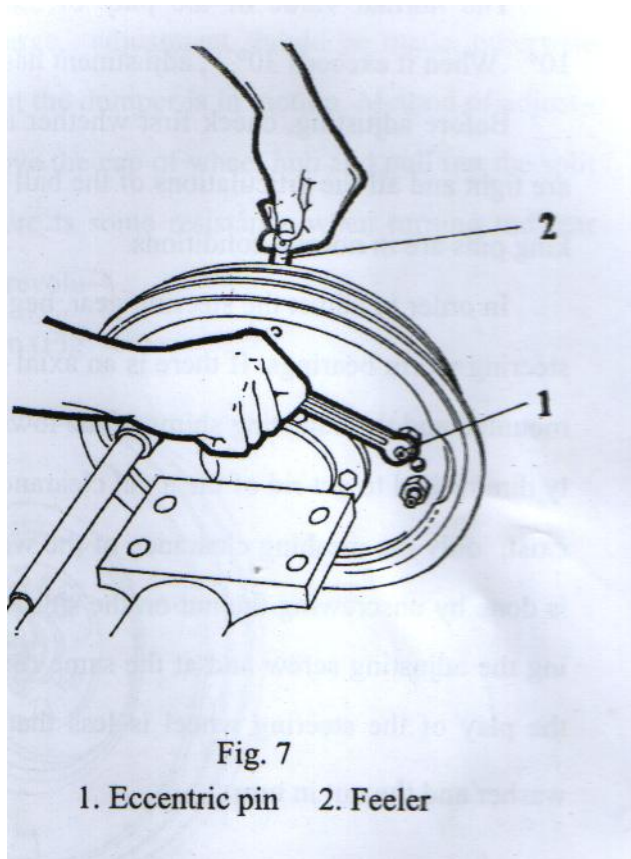
D. Adjustment of Beak

1. Adjustment of clearance between brake shoes and brake drum:

When the brake shoes are at the original release position, a proper clearance between the drum and the friction linings of the shoes should be kept. Too small a clearance will not be liable to ensure the full releasing of the brake. An excessive large clearance will result in so big a play of the pedal that the driving operation becomes inconvenient.

The normal clearance should be kept in a range of 0.2-0.5mm. when adjusting, loosen the locking nut and turn the eccentric pin 1. The adjustment is performed by use of varying the eccentricity pin.

For the measurement, insert feeler 2 through a long hole on the side of the brake drum (Fig. 7). After adjusting, lock the nut.



2. Adjustment of play of brake pedal:

As the friction linings of the brake wear down, the play of the brake pedal will increase to such a degree as to cause the braking less efficient. The normal play of the pedal should be adjusted to the range of 15-30mm.

The adjustment of play is performed by changing the length of pull rod of the brake pedal. By shortening the pull rod, the play will be increased (Fig. 8)

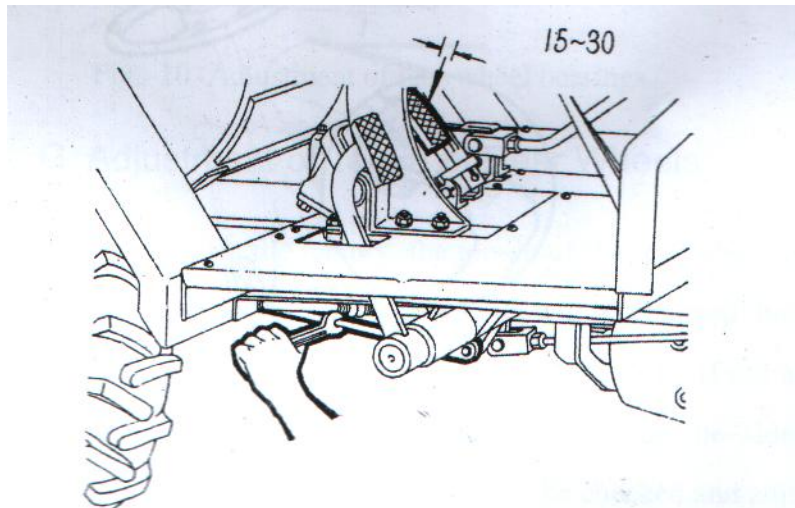


Fig. 8 Adjustment of play of brake pedal

E. Adjustment of Steering Gear

The normal value of the play of steering wheel should be not greater than 10° . When it exceeds 30° , adjustment has to be made.

Before adjusting, check first whether all the bolts for securing the steering gear are tight and all the articulations of the ball and socket joints and the steering knuckle king pins are in normal conditions.

In order to adjust the steering gear, begin with checking the axial clearance of the steering worm bearings. If there is an axial clearance, the steering gear should be dismantled and the adjusting shims of the lower end of the steering gear housing properly diminished to get rid of the axial clearance of the worm. If axial clearance does not exist, only the meshing clearance of the Worm and the roller has to be adjusted. This is done by unscrewing the nut on the sidecover, getting out the locking washer, turning the adjusting screw and at the same time trying to turn the steering wheel, until the play of the steering wheel is less than 10° (Fig. 9). Then put on the locking washer and nut in turn.

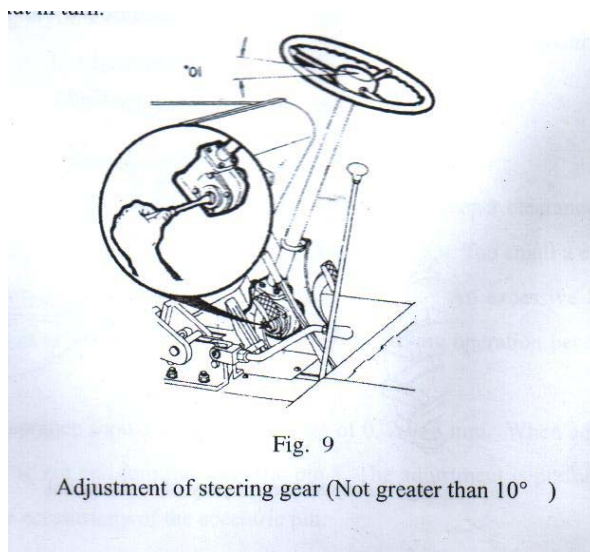


Fig. 9

Adjustment of steering gear (Not greater than 10°)

F. Adjustment of bearing of Rear Wheels

The axial clearance of the rear wheel bearings are generally in the range of 0.05-0.2mm. In case it is excessive large, adjustment should be made, otherwise swing of the rear wheel will occur, when the dumper is in motion. Method of adjustment: First jack up the rear wheel, remove the cap of wheel hub and pull out the split pin. Tighten the adjusting nut until there is some resistance when turning the rear wheel. Unscrew the nut back 1/30—1/8 revolution again. Then replace the split pin (Fig. 10)

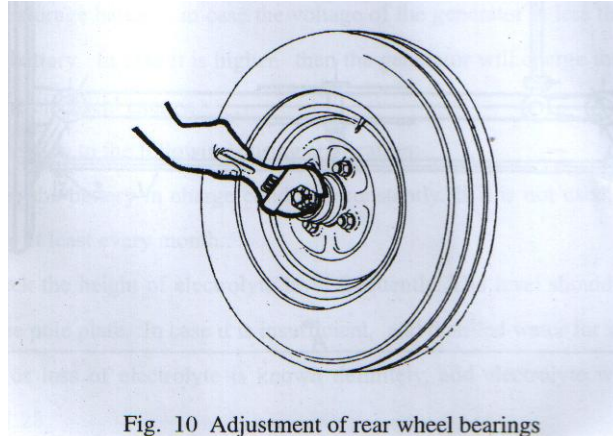


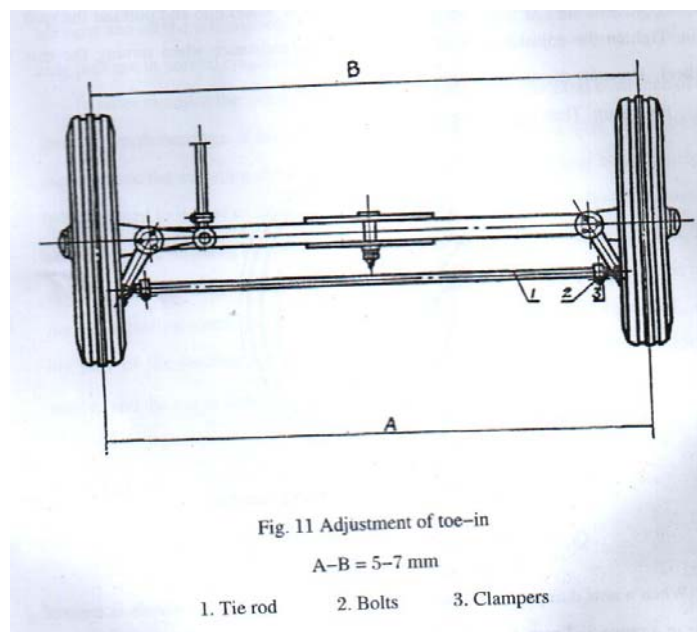
Fig. 10 Adjustment of rear wheel bearings

G. Adjustment of Toe-in of Rear Wheels

G. Adjustment of Toe-in of Rear Wheels

When a new dumper leaves the factory, the toe-in of the rear wheels is ensured to be in a range 5-7mm. During operation, the toe in will be changed due to deformation and wear of the parts of steering mechanism and rear axle. If not adjusted in time, it will result in inconvenience of steering and increasing the one-sided wear on the surface of the rear tyres. Therefore, the toe-in must be checked and adjusted regularly.

Method of adjustment: Park the dumper on the even ground and set it in the rectilinear traveling position. Loosen the bolts 2, adjust the length of the tie rod 1 so as to make the backward wheel tread A of the rear wheels is 5-7mm more than the forward wheel tread B. Then tighten the bolts 2 (Fig. 11)



Chapter 4 Electrical Equipments

Electrical system of the adopts D. C. voltage, 12V and positive pole to be ground.

A. Storage Battery

Two storage batteries with type 6-Q-75S are used in series to make 12 volts. Its function is to supply electricity to starter, when the engine is started. When the engine is running at normal condition, power will be supplied to electrical equipments from storage battery. In case the voltage of the generator is less than the voltage of the battery. In case it is higher, then the generation will charge the battery to reserve some electrical energy.

Pay attention to the following during application:

1. Keep the battery in charge condition constantly. If it is not used, charge the battery once at least every month.
2. Check the height of electrolyte level frequently. The level should be 10-15mm over the pole plate. In case it is insufficient, add distilled water for supplement, If leakage or loss of electrolyte is known definitely, add electrolyte with specific gravity of 1.28.
3. Check whether vent hole of battery is blocked or not constantly. Remove soil and dirt attached on the external surface, clean away overflow electrolyte and coat with thin layer of calcium base grease on electrical pole to prevent from corrosion.
4. Do not use starter excessively.
5. Mounting of battery should be firm to avoid damage due to shock.

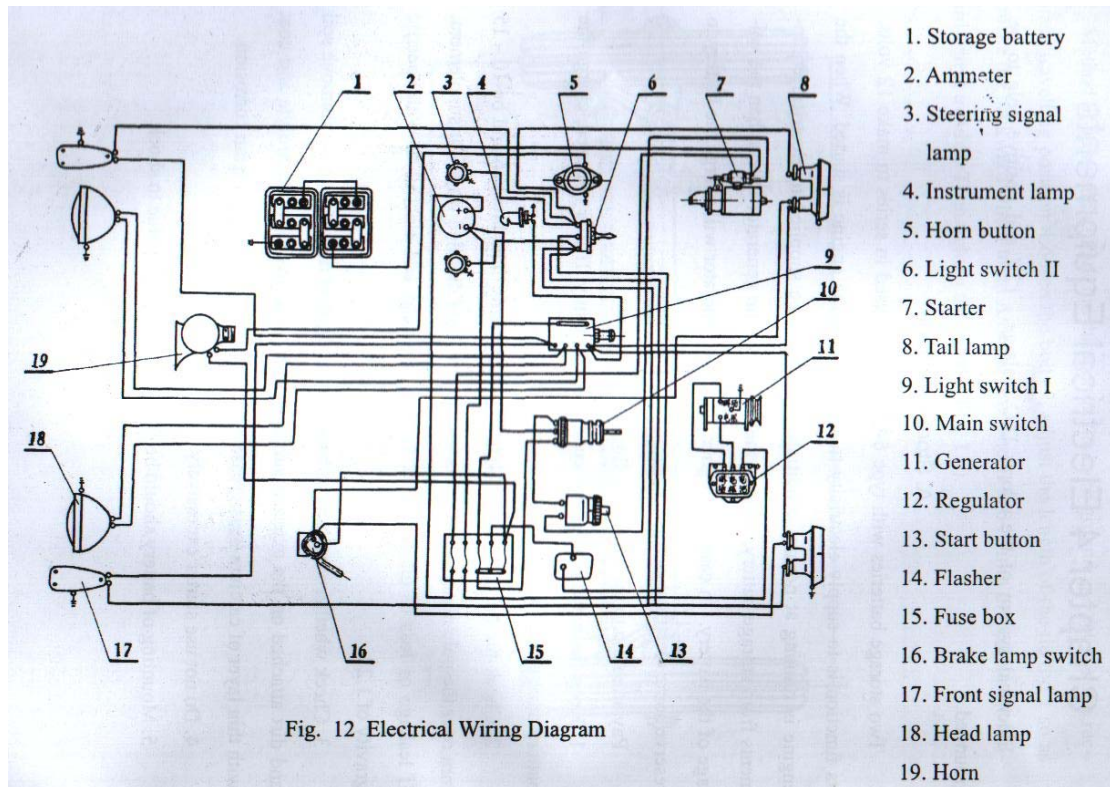


Fig. 12 Electrical Wiring Diagram

B. Generator and Regulator

1. Direct current generator:

On the generator there are written words, which are marked as "ARMATURE" and "FIELD" for two posts and as "EARTH" for earthing bolt, They should be connected with posts of relay regulator on which it will be marked with the same letters as before, likewise it is suitable for "EARTH" bolt.

Pulley of generator is driven by pulley engine through V-belt, two ends of generator are fixed on the frame of generator by bolts, and the other brace on generator is used to adjust the tension of V-belt of generator will be as follows: When press down the belt with force of 3-5kg at middle part of belt, the sag should be 10-15mm.

3. Relay regulator:

Relay regulator consists of current cutter, voltage regulator and current limiter.

On the relay regulator there are three posts marked as "ARMATURE", "FIELD" and "CELL" and one earthing bolt. "ARMATURE" and "FIELD" posts and earthing bolt at lateral side of base of relay regulator should be connected with the corresponding posts and bolt on generator. "CELL" post is connected with "-" sign post of ammeter, while "+" sign post of ammeter is connected with negative pole of battery.

If abnormal work of regulator is found or after the dumper has been running for 1000 hours, it should be adjusted by the skilled electrician.

C. Starter

Type of starter is QD1202A, 12V, 1.4KW. Starter is used to start the engine with the power supplied from battery. The displacement of gear or starter is actuated in electromagnetic form and the starter has unidirectional roller type clutch which can prevent the armature of starter from damage along with high speed revolution of engine after starting.

D. The Others

1. Fuse box

When some troubles such as overcurrent ect, are occurred in the electrical circuit, fuses can be melted automatically so as to ensure safety in work of electrical equipments.

There are five grades of fuses in the general assembly of BX503 fuse box, application and working current of each grade are shown in the following list:

Table 2.

Grade	1	2	3	4	5
Application	General fuse	Electrical circuit for charging	Head lamp for tail lamp	Steering signal lamp	Brake lamp, horn
Working current (A)	30	20	6	6	10

If any abnormal condition is found in electrical circuit, check the corresponding fuse box immediately whether it is broken or not, According to the grade of fuse which is found to be broken, check the elements which have been protected. After the trouble is remedied, pull out the fuse plate, move away the moving installed head, take down spare fuse about 60mm from up end of fuse plate and wind up the fuse tightly in the static installed head. Then move back

the moving installed head and insert the fuse plate into original position of fuse box again.

2. Ammeter:

Ammeter is used to indicate whether the battery is charged or discharged. When the battery is charged by the generator, the indicator deviates toward "+"; on the contrary, toward "—" and zero indication expresses no current in the battery.

4. Electrical lock:

Electrical lock controls the overall electrical system. After inserting the key into lock hole, all the power supplies of electrical equipments are switched on, when the key is turned to right side. On the contrary, when the key is turned to left side, the same supplies as before are switched on except the starter. In order to protect the starter, it requires that key of electrical lock must be turned to left side immediately, after the engine is started.

Chapter 5 Maintenance of Dumper

A. Oil, Fuel and Water to be used for Dumper

1. Lubricants to be used for all parts of the dumper should correspond with the requirements of table 3. For the gearbox, driving axle and steering gear assemblies, the replenished lubricant should level up to the height of the cone screw hole on the housing side (on the side of gearbox and the front of driving gear).

For renewal of the lubricant of above-mentioned assemblies, it must be made at once before the temperature of the parts does not yet start to drop, after the dumper is stopped.

Lubrication of the engine is to be proceeded in accordance with the prescription on the specification of the engine.

2. Points to be observed in the use of fuel:

Strict use of the cleanest diesel oil is the foremost factor to prevent the engine from troubles. Clean diesel oil will reduce the wearing between the fitting surfaces of the fuel injection pump and nozzle, and thus ensure the normal work of the mechanisms. Therefore, in the use of fuel, following points have to be observed:

- (1) The staining with dirt of the diesel oil can be hardly avoided after several transportation, diesel oil has to be precipitated for more than 48 hours before use.
- (2) Felt, sheer cloth or old cotton cloth are not allowed to be used to wipe utensils for holding fuel as well as all the connecting pipe nipples.
- (3) Fuel has to be filtered strictly before put into use.

3. Cooling water

Clean soft water such as rain water, running water and river water should be used for cooling. Water out of well and fountain containing rather more impurities can not be used for the sake of avoiding the increase of the water scale.

B. Maintenance of Dumper

The dumper should be checked and maintained at regular intervals. According to intervals of operation, maintenance is classified into grades as follows:

- 1 Shift maintenance: once after every 8-10 hours of operation.
2. First grade maintenance: once after every 50 hours of operation.
3. Second grade maintenance: once after 200 hours of operation.
4. Third grade maintenance: once after every 600 hours of operation.

Jobs in each grade will be stated respectively as follows:

1, Shift maintenance

- (1) Clean the body and the chassis.
- (2) Check water level in radiator, refill if necessary.
- (3) Check fuel level in tank, refill if necessary.
- (4) Check oil level in oil sump of engine. Fill to level of medium mark on dipstick if necessary.
- (5) Check and remedy any leakage of gas, water and oil or fuel at various junction.
- (6) Check inflation pressure of tires.
- (7) Check and tighten main clamping bolts and nuts, particularly those for propeller shaft, front axle (U- Bolt), steering linkage and wheels, etc.

(8) Check whether driver's tool kit are complete.

(9) In case of operating a dumper in more dusty atmosphere, it is necessary to clean the air filter, when the environmental air condition is comparatively clean, cleaning of the air filter and change of oil maybe done every 50 hours of operation.

2. First grade maintenance

(1) Finish shift maintenance.

(2) Check and adjust suitable tension of V-belt of generator.

(3) Clean the filter screen in the fuel tank.

(4) Check the level of electrolyte in the storage battery, fill up with distilled water if necessary. At the same time, check whether the vent plug of storage battery is breathing.

(5) Lubricate according to table 3.

3. Second grade maintenance

(1) Finish first grade maintenance.

(2) Check valve clearances, adjust them if necessary.

(3) Wash oil sump and oil strainer of the engine, and renew oil in the oil sump.

(4) Screw off the screw plug from the crankshaft. Clean the cavity of the crankpin and two oil passages in the crankshaft with fresh fuel.

(5) Clean the filter cartridge of fuel filter with clean fuel, replace the filter cartridge if it is worn.

(6) Renew grease in the rear wheel hubs, check the rear wheel bearings to keep optimum clearance.

(7) Lubricate according to table 3.

4. Third grade maintenance.

(1) Finish second grade maintenance.

(2) Clean the fuel tank.

(3) Dismantle the cylinder head, remove carbon deposit on the cylinder head and the piston top, and clean them. Check the valve tightness, lap the valves together with the valve seats if necessary.

(4) Check the clamping and locking of the connecting rod bolts.

(5) Wash the cooling water passage as follow Pour into the water passage a solution of 25% hydrochloric acid (HCl), keep it for 10 minutes or so and then wash down with fresh water. Repeat again if not thoroughly cleaned.

Note : the radiator must be removed from the engine before cleaning.

(6) Check the free travel of the steering wheel. Adjust it if necessary.

(7) Check and adjust the brakes.

(8) Check the free travel of clutch pedal. Adjust it if necessary.

(9) Check and adjust the rear wheel toe-in.

(10) Check and adjust the tightness of the driving and driven bevel gear bearings as well as the axial play of axle shafts.

(11) Renew gear oil in the gearbox, the driving axle and the steering gear.

(12) Renew grease in the driving wheel bearings. Lubricate according to Table 3.

(13) Wash outer surface of the storage battery with lukewarm water and clean it. Check the battery voltage and the specific gravity of electrolyte, if the battery is found abnormal discharging, it should be repaired at once and charged with external power source.

(14) Inspect the contact faces of carbon brushes on the dynamo, correct or replace them if necessary.

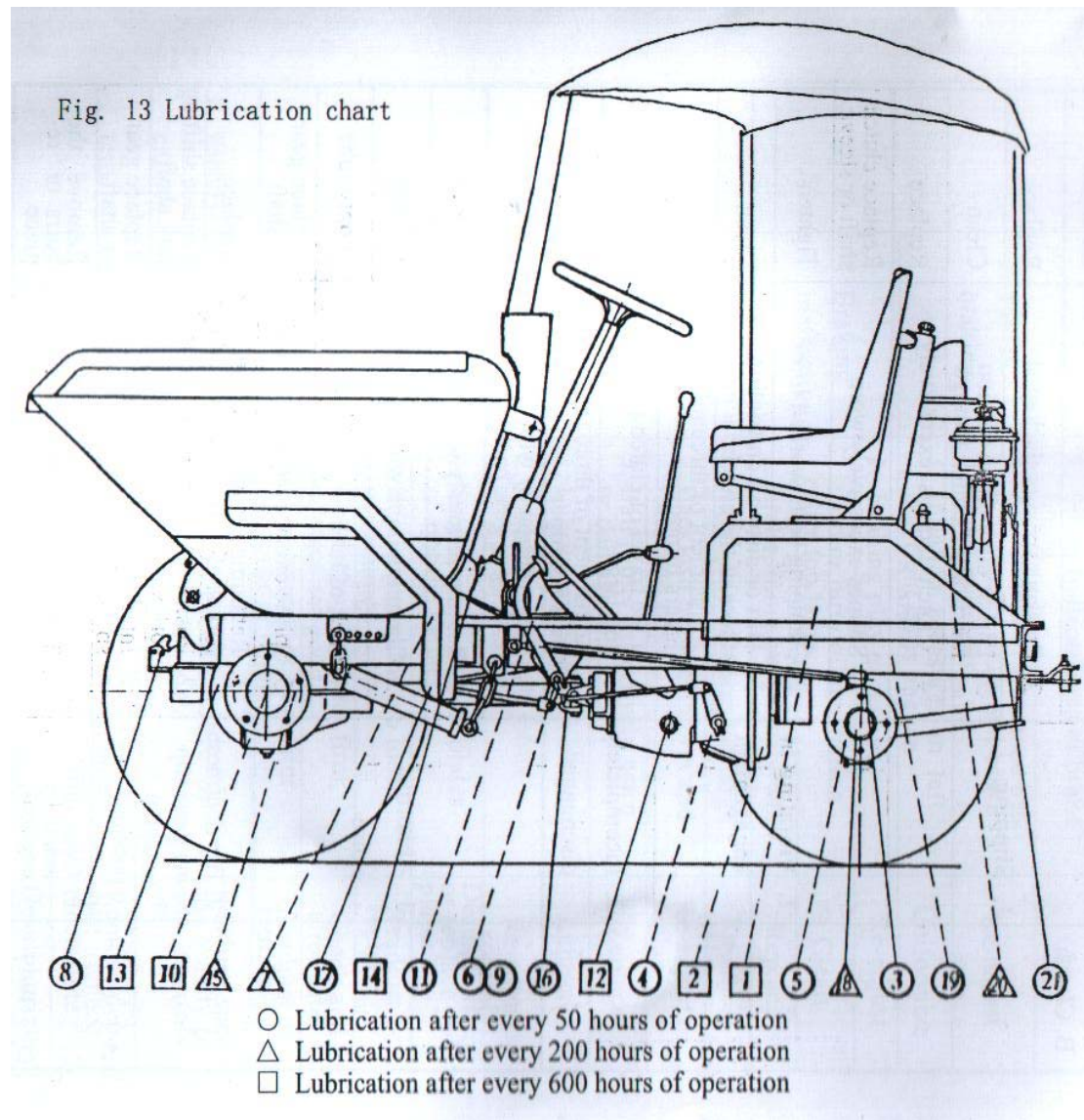
(15) After all maintenances and adjustments on the whole dumper are done, make short-time run-in to check whether all control mechanisms function properly.

Table 3. Lubrication chart

Item No	Lubrication Spot	Point of Lubrication	Qty	Lubricant	Interval of lubrication (hr)
1	Belt tensioner and its pivot	Grease nipple	2	Bearing oil No 3 (SY 154-65)	600
2	Bearing in clutch cover	"	1	Calcium base grease(GB491-65)	600
3	Steering ball joint	"	4		50
4	Clutch release fork shaft	"	2		50
5	Steering knuckle king pin	"	4		50
6	Brake pedal shaft	"	1		50
7	Medium lever pivot support of brake	"	2		200
8	Front locking mechanism of skip	"	2		50
9	Pedal shaft seat	"	1		50
10	Front wheel bearing		2		600
11	Locking mechanism of skip Grease nipple		2		50
12	Gearbox	Filler plug	1	Summer gear oil	600
13	Driving axle	Filler plug	1	used in summer,	600
14	Steering gear	Filler plug	1	Winter gear oil used in winter(SYB1103-62S)	600
15	Cam shaft bushing of brake		2	Calcium base grease (GB491-65)	200
16	Universal-joint trunnion	Grease nipple	2	"	50
17	Telescope yoke of propeller shaft	Grease nipple	1	"	50
18	Rear wheel hub		2	"	200
19	Rear axle pivot(Note)	Grease	2	"	50

		nipple			
20	Oil sump of engine		1	Diesel engine oil T8	200
				(SYB1152-62S)	
21	Air filter pan		1	Diesel engine oil	50
				T8(SYB1152-62S)	
22	Seat wheel	Grease	2	Calcium base	50
		nipple		grease(GB491-65)	

Note. When adopting the plate spring, the lubrication points must be changed: plate spring pin 6.



Chapter 6 General Troubles and Causes Analysis

Position	Trouble	Probable cause	Recommended remedies
A. Engine		Reference to "Operation Manual for S195N Diesel Engine"	
B. Clutch	.1. Slipping	1.Free travel of clutch pedal too small	Re-adjust
		2.Pressure springs slackened	Replace
		3.Dirt or dirty oil on friction faces of the clutch facings	Clean
		4.Clutch facings excessively worn	Replace
	2, Vibrating in engagement	1. Splines excessively worn	Replace clutch shaft or sleeve
		2. Clamping bolts worked loose	Tighten
3 Incompletely disengaged		3.Dirt or dirty oil on friction faces of the clutch facings	Clean
		4. Adjustment of three release levers improper	Re-adjust
		1. Free travel of clutch pedal too large	Re-adjust
C. Gearbox	1. Abnormal noise	2. Adjustment of three release levers improper	Re-adjust
		1. Gears seriously worn or excessive gear backlash	Replace
		2. Bearing seriously worn	Replace
		3. Clamping bolts worked loose	Tighten
		4. Lack of lube	Supply lube
	2. Trip dog(meshing gears slip to neutral position)	5 Spline excessive worn	Replace gear or shaft
		1. Retaining spring of shafting fork shaft slackened or failed	Replace
		2. Positioning notches in shafting fork shaft excessively worn	Replace shafting fork shaft
	3. Gears difficult to be engaged	3. Internal spline of gear or splin-ed shaft excessively worn	Replace gear or shaft
Tooth ends of gear burred		Remove the burrs or replace	

D. Driving axle	1. Abnormal noise in driving	1. Meshing point of spiral bevel gears abnormal 2. Bearing seriously worn or loosed 3. Gears seriously worn	Adjust or replace Replace or re-adjust Replace
	2. Abnormal noise in braking	1. Brake anchor plate bended 2. Brake lining rivets loosed 3. Brake drum damage	Repair or replace Repair Repair or replace
	3. Yaw in braking	1. Oil on friction faces of brake lining 2. Adjustment of clearance between brake drum and brake shoes improper 3. Inflation pressure in left and right tyres uneven	Clean Re-adjust Uniformize
	4. Braking ineffective	1. Braking play excessive 2. Dirt or dirty oil on friction roller too large 3. Brake lining excessively worn	Re-adjust Clean Replace
E . Steering system	1. Steep increase of steering wheel play	1. Axial play of worn too large 2. Backlash between worm and roller too large 3. Ball joints excessively worn or damaged	Re-adjust Re-adjust or replace Replace
	2 Hard steering	1 Lubrication poor 2 Adjustment of ball joints improper	Lubricate Re-adjust

Position	Trouble	Probable cause	Recommended remedies
F. Electrical system	1. Generator is normal, but storage battery can not be charged or low rate for charging	1. Sulphuration on pole plates of storage battery 2. Belt of generator too loose or damaged 3. Connecting wire not firm contact not good 4. Adjustment of regulator improper or damaged	Desulphurizing or replace pole plates Readjust or replace Check and eliminate Readjust or replace
	2. Capacity of	1. Specific gravity or level of	Readjust specific

storage battery insufficient	electrolyte too low	gravity or add electrolyte
	2. Short circuit between pole plates	Remove deposits: replace electrolyte
	3. Sulphuration of pole plates	Desulphurizing or replace pole plates
	4. Contact of conductor not good	Check and eliminate
	5. Active material on pole plates dropped	Replace pole replace
3. Gears difficult to be engaged	1. Elimination of residual magnetism	According original polarity of generator magnetize by the way to connect two ends of field wiring with storage battery
	2. Return circuit of field wiring broken	Check and connect
	3. Contact of commutator not good	Grind it with No.0 or No.00 emery paper
	4. Brush blocked, not sensitive	Correct size of brush, adjust spring pressure
	5. Short circuit between wirings of armature	Check and repair
4. Abnormal sound during running of generator	1. Belt of generator too loose or too tight	Adjust
	2. Wear of bearing due to insufficient oil	Clean and add lube
	3. Bolts of magnetic pole loose	Tighten
5 Starter can not started	1. Current in storage battery not sufficient	Charge or replace storage battery
	2. Contact not good	Check and eliminate
	3. Contact of brush with commutator of starter not good	Repair or replace brush
	4. Short circuit or broken circuit between armature and field wiring	Repair

Appendix

I. Schematic Diagram of Transmission System

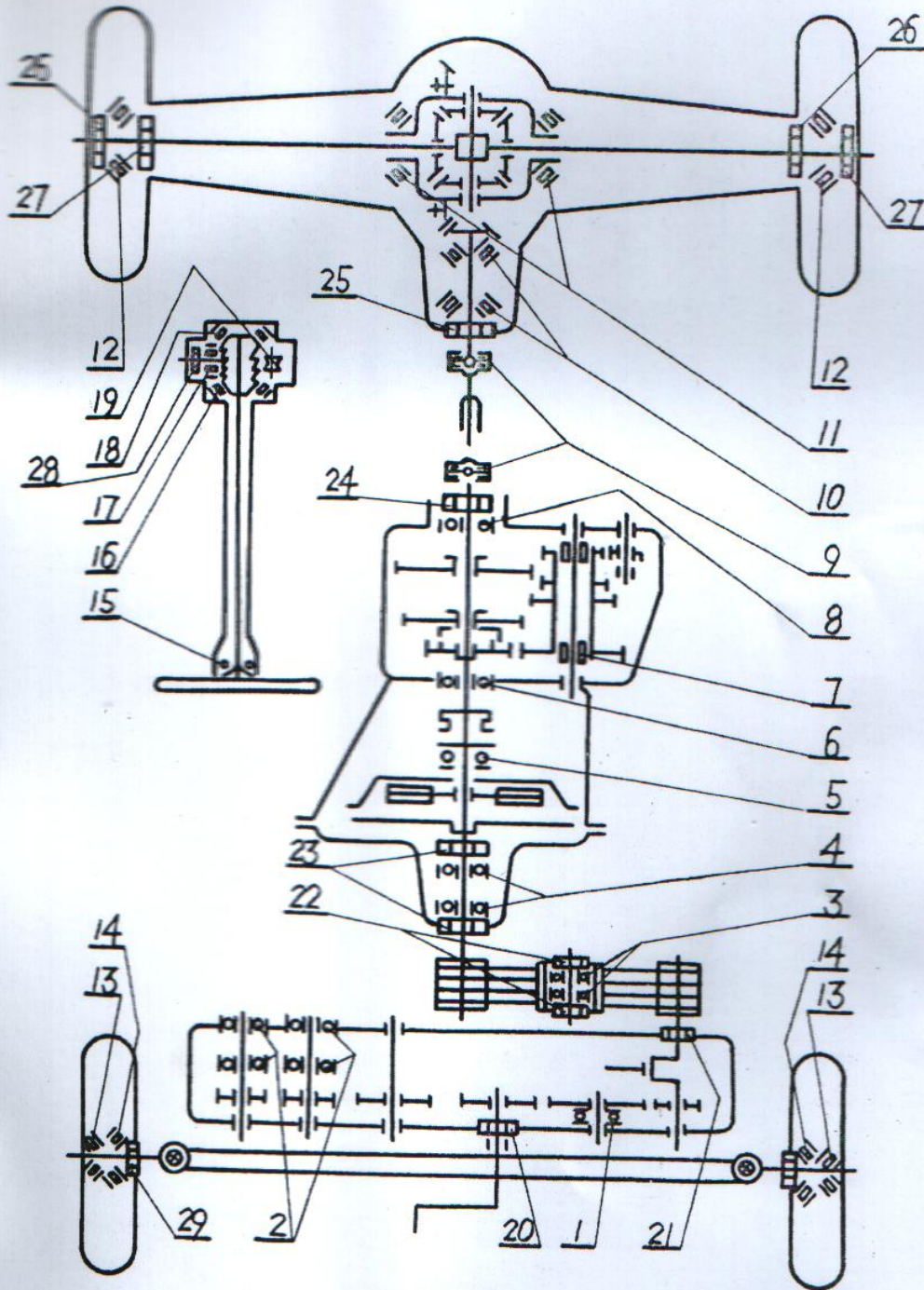


Fig. 14

List of Bearings

Item No	Unit to be assembled to	Position of assembling	Nomenclature	Type	Standard	Qty.
1	Engine	Governor ball race	Single direction ball thrust bearing	8106	GB301-64	1
2	Engine	Upper and lower balancing shaft	Single-row radial ball bearing	205	GB276-64	4
3	Belt tensioner	Tension pulley	Single-row radial ball bearing	204	GB276-64	2
4	Clutch	Clutch shaft	Single-row radial ball bearing	207	GB276-64	2
5	Clutch	Release bearing sleeve	Single direction ball thrust bearing	688911	Nonstandard	1
6	Gearbox	Transmission case and input shaft	Single-row radial ball bearing	50208	GB277-64	1
7	Gearbox	Lay shaft gear	Needle bearing	64904	Nonstandard	2
8	Gearbox	Transmission case and out-put shaft	Single-row radial ball bearing	307	GB276-64	1
9	Propeller shaft	Universal-joint turnnion	Needle bearing		Nonstandard	8
10	Driving axle	Driving bevel pinion shaft	Single-row conical roller bearing	7607	GB297-64	2
11	Driving axle	Differential housing	Single-row conical roller bearing	7201	GB297-64	2
12	Driving axle	Axle shaft and hub	Single-row conical roller bearing	7510	GB297-64	2
13	Steering axle	Stub axle end	Single-row conical roller bearing	7205	GB297-64	2
14	Steering axle	Internal side of stub axle	Single-row conical roller bearing	7206	GB297-64	2
15	Steering axle	Steering shaft tube	Single-row conical roller bearing	796905	Nonstandard	1
16	Steering gear	Upper end of steering worm	Inner-ringless Single-row conical roller bearing	977907	Nonstandard	1

17	Steering gear	Pitman arm shaft	Single-row radial cylindrical roller bearing	922205	Nonstandrad	1
18	Steering gear	Bottom end of steering worln	Inner-ringless single-row conical roller bearing	977907k	Nonstandrad	1
19	Steering gear	Pitman arm shaft	Double-row angular ball bearing	976701	Nonstandrad	1

List of Seal

Item No.	Unit to be assembled to	Position of oil seal	Specifications	Standard	Quantity
1	Engine	Starting gear shaft and gear casing	35x58x12		1
2	Engine	Crankshaft and main bearing housing	50x80x12		1
3	Belt tensioner	Tension pulley and its shaft	35x56x12		2
4	Clutch	Clutch cover and driving plate	55x75x12		2
5	Gearbox	Transmission case and output shaft	50x70x12		1
6	Driving axle	Drive bevel pinion shaft	50x84x10		1
7	Driving axle	Axle shaft and hub	60x80x13		2
8	Driving axle	Axle shaft and front axle housing	45x62x12		2
9	Steering gear	Pitman arm shaft and steering housing	32x44x10		1
10	Steering axle	Stub axle and hub	50x68x12		2