HARE&FORBES
MACHINERYHOUSE

Established 1930
Distributors of new & used workshop Equipment

D165A
Z3040 X 10 RADIAL DRILL

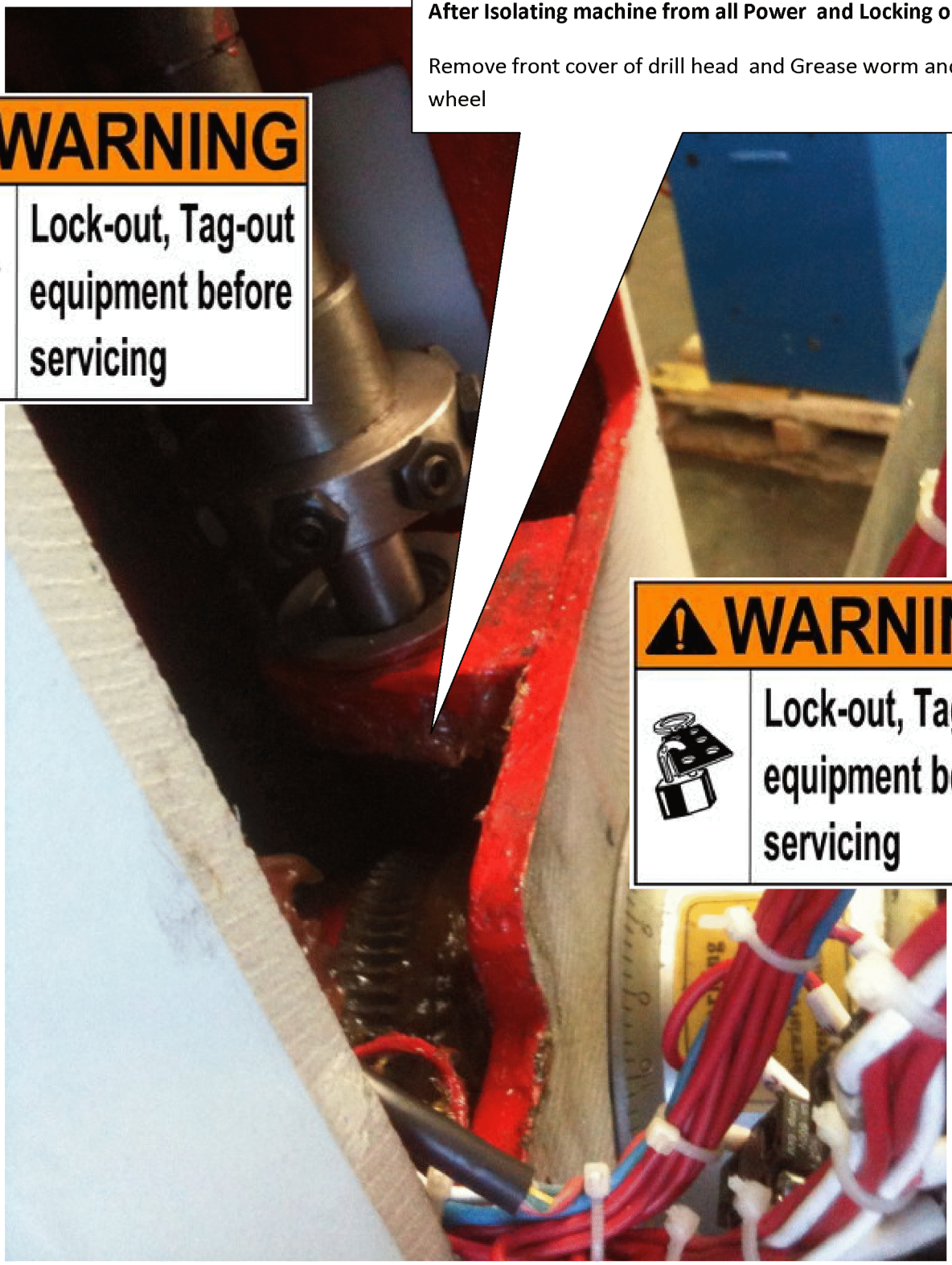
INSTRUCTION & PARTS MANUAL

8-11-11

Every Six Months

After Isolating machine from all Power and Locking out

Remove front cover of drill head and Grease worm and Worm wheel



Retain this manual for future reference
Attention: Read this manual thoroughly before operating

ZQ3040×10/1 RADIAL DRILLING MACHINE

INSTRUCTION

The max. Drilling diameter	40mm
Distance	1000 mm

CONTENT

No notice if the structure changed slightly in our later manufacture

一、 Main application and feature

1.1 Application:

This machine is widely suitable for machinery processing. That is drilling、scrape、ream and tapping. Under certain conditions, it also can boring hole.

1.2 Feature:

1. Appearance is bounteous. The total layout is proportional。
2. Mechanical speed change which easily operation。
3. The surface of guide takes the quench treatment, which prolong the longevity of machine's operation.
4. There are a set of safety defense system 。
5. The electric system is reliable. It must according to relevant stipulate.
6. Reliable Structure, good manufacture and high precision.

二、 Main parameter and dimension

2.1 Main parameter

Max. drilling diameter: 40mm

Taper.....MT4

Number of spindle speeds..... 6

Range of spindle speeds: .....75 ~ 1220 r/min

Number of spindle feeding: 3

Range of spindle feeding: .....0.10 ~ 0.25 mm/r

Speed of arm elevating: 1.21m/min

Angle of arm: .....360°

Max. distance of spindle: .....200 N.m

Max. feeding power of spindle allowed: .....6300 N

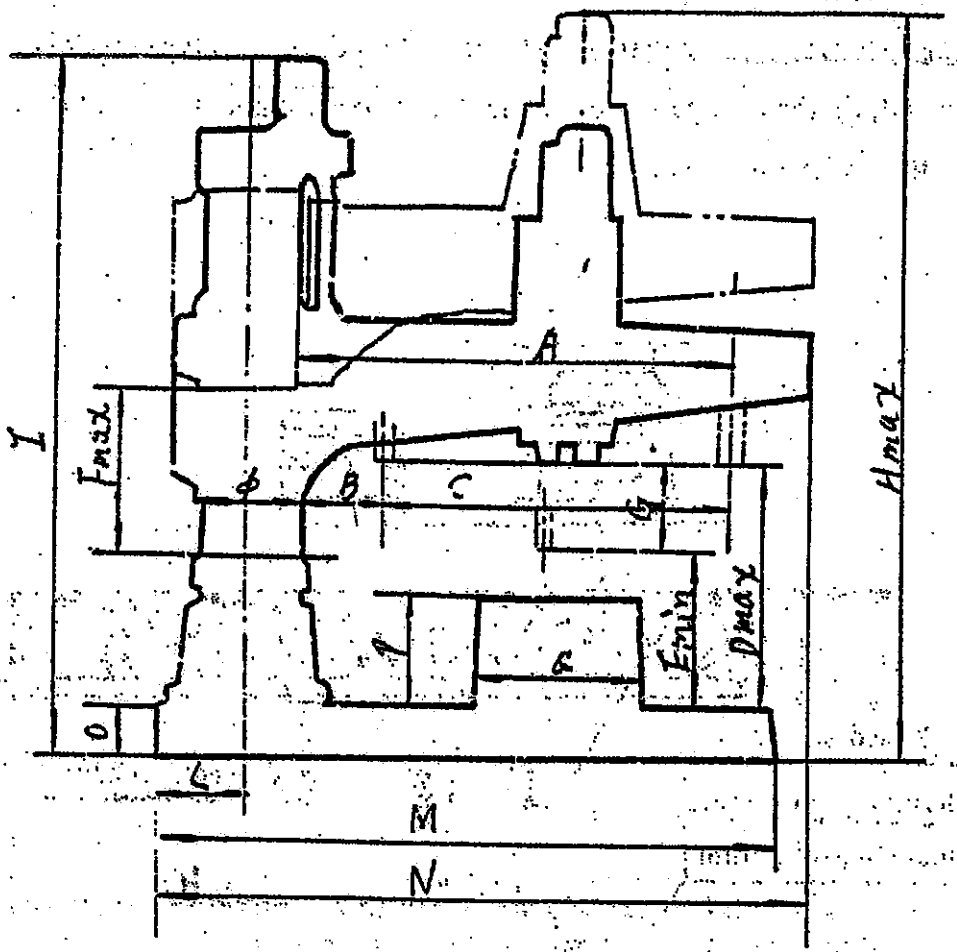
Main motor power: .....1.5 KW

Arm elevating motor power.....0.55 KW

Cooling motor power: .....0.09 KW

Weight: .....1230 Kg

2.2 Dimension

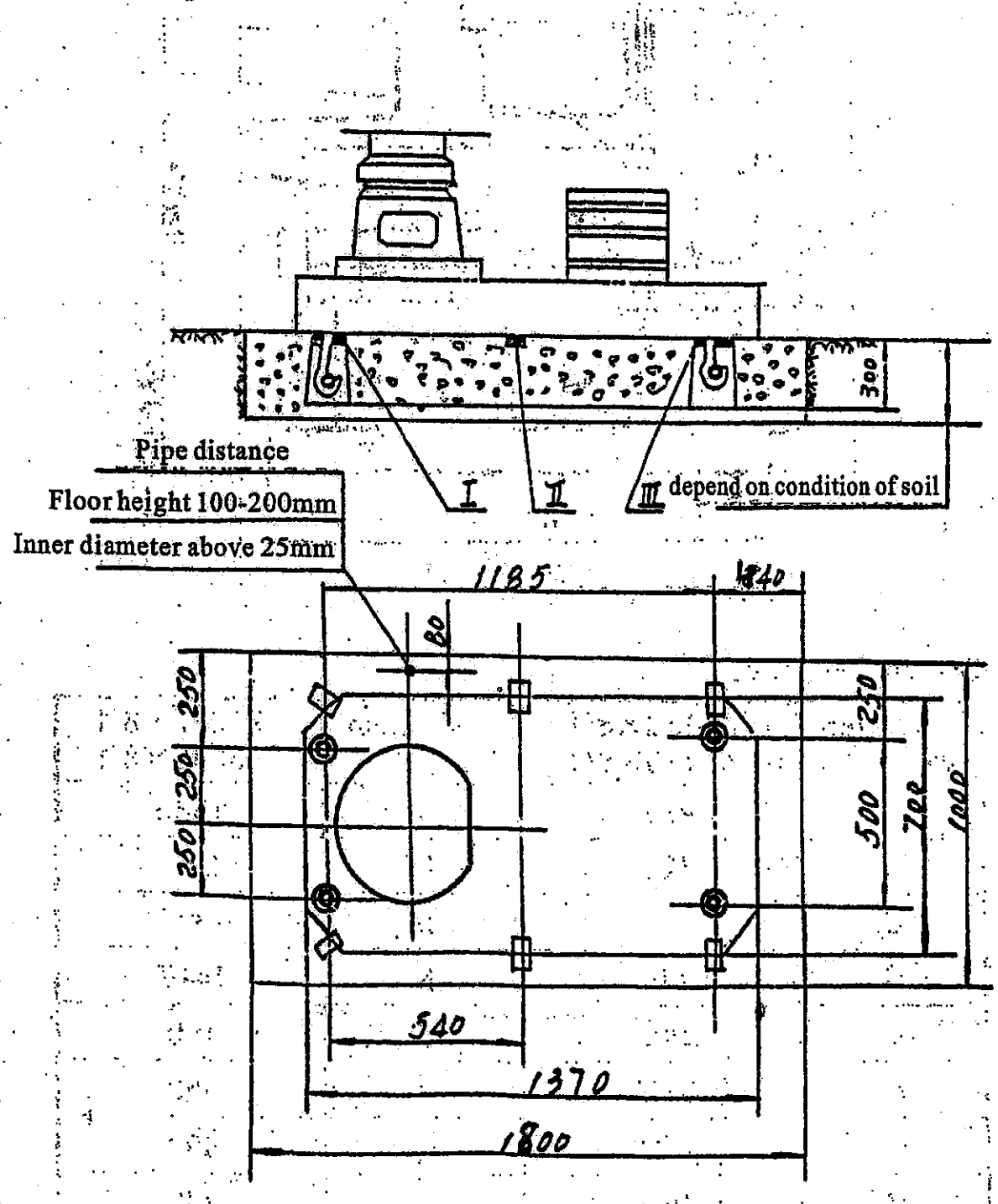


Dimension parameter

No. \ Item	ZQ3040×10/1	No. \ Item	ZQ3040×10/1
A	1020	I	1885
B	320	L	265
C	500	M	1370
D	900	N	1617
E	240	O	160
F	510	P	350
G	150	Q	600
H	2060	Φ	200

2.3 Install and adjust precision

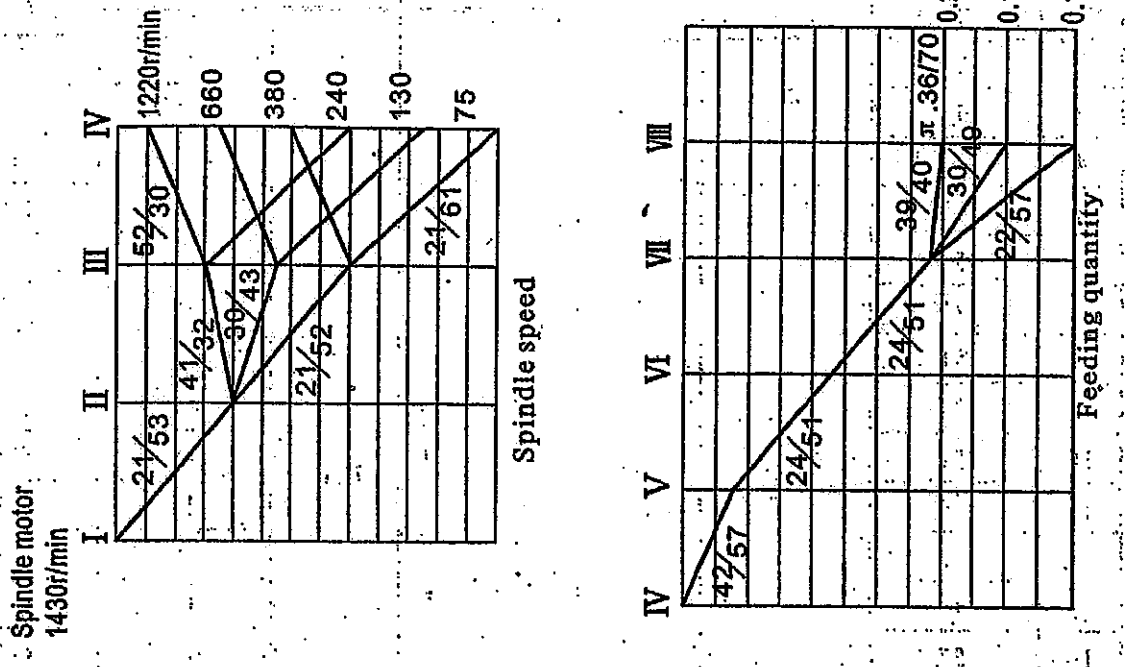
Put the iron pad according to the draft. The number of vertical section and horizontal section can't allowance exceed to 0.04/1000. After adjust the all parts, adjust the precision. After that, fix the iron pats and foot nut by cement, When it dry, tight the foot nut and proofread the precision at last.

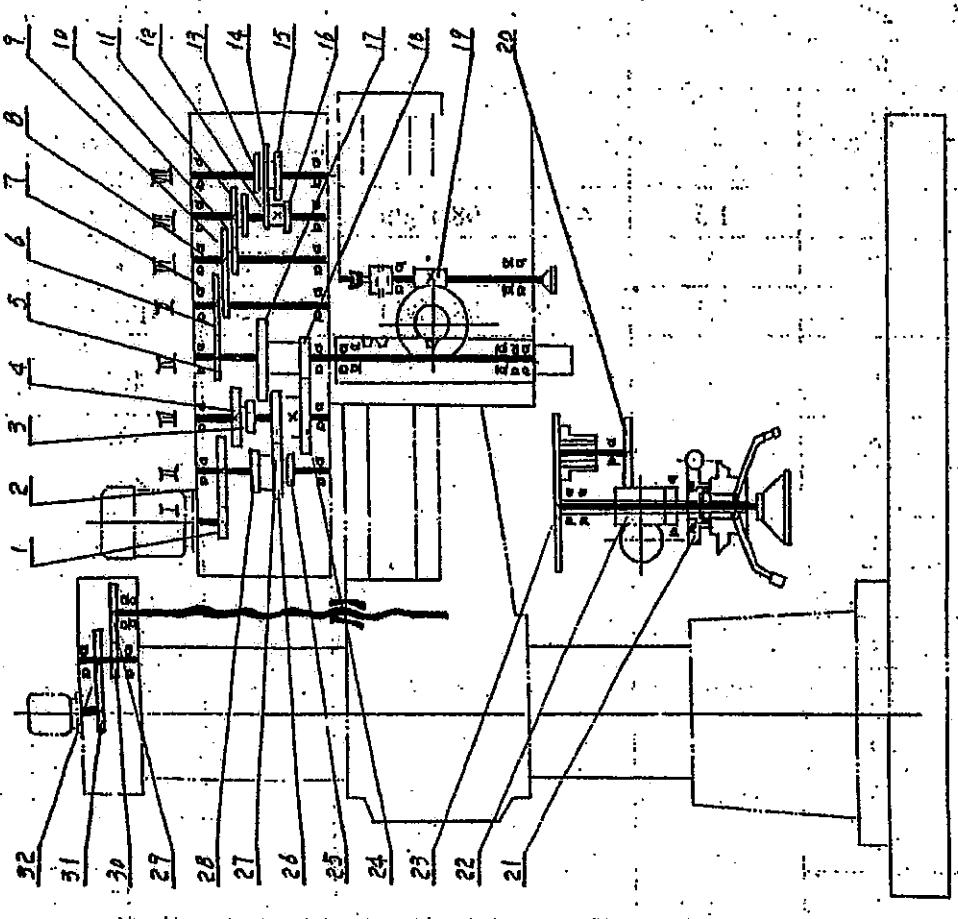


Base figure

Ⅲ、Driving system

3.1 driving system





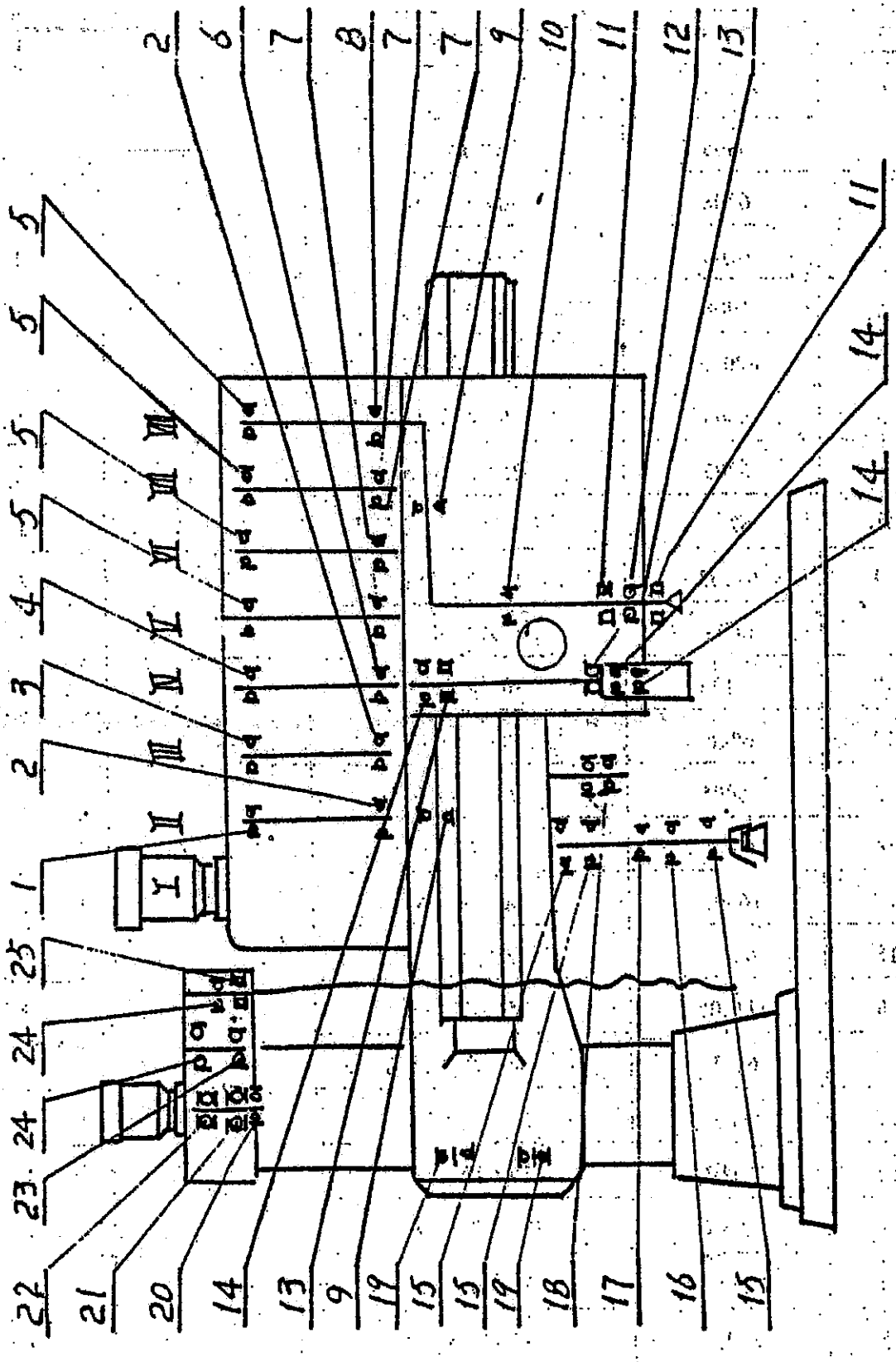
Driving system map

3.2 Driving system parts list

No.	Tooth number	Model No.	Angle and direction	precision grade	material No.	Head treatment & hardness
1	21	2		7CD	45	G52
2	53				45	G52
3	43				40 Cr	G52
4	21				40 Cr	G52
5	42	1.5			45	G52
6	57				45	G52
7	24				45	G52
8	51				45	G52
9	24				45	G52
10	51				45	G52
11	39				45	G52
12	22				45	G52
13	40				40 Cr	G52
14	57				40 Cr	G52
15	49				40 Cr	G52
16	30				45	G52
17	61	2			40 Cr	G52
18	30				40Cr	G52
19	1	1.5	4° 05′ 08 right	8CD	40Cr	T235
20	47	2		7CD	45	G52
21	70	1.5	4° 05′ 08 right	8CD	HT300	
22	18	2		7CD	40Cr	T235 D0.3-461
23	18				40Cr	G48
24	52				40Cr	G52
25	21				40Cr	G52
26	41				40Cr	G52
27	32				40Cr	G52
28	30				40Cr	G52
29	56				45	G52
30	24				45	G52
31	24				45	G52
32	71				45	G52

3.3 Bearing

3.3.1 rolling bearing diagram

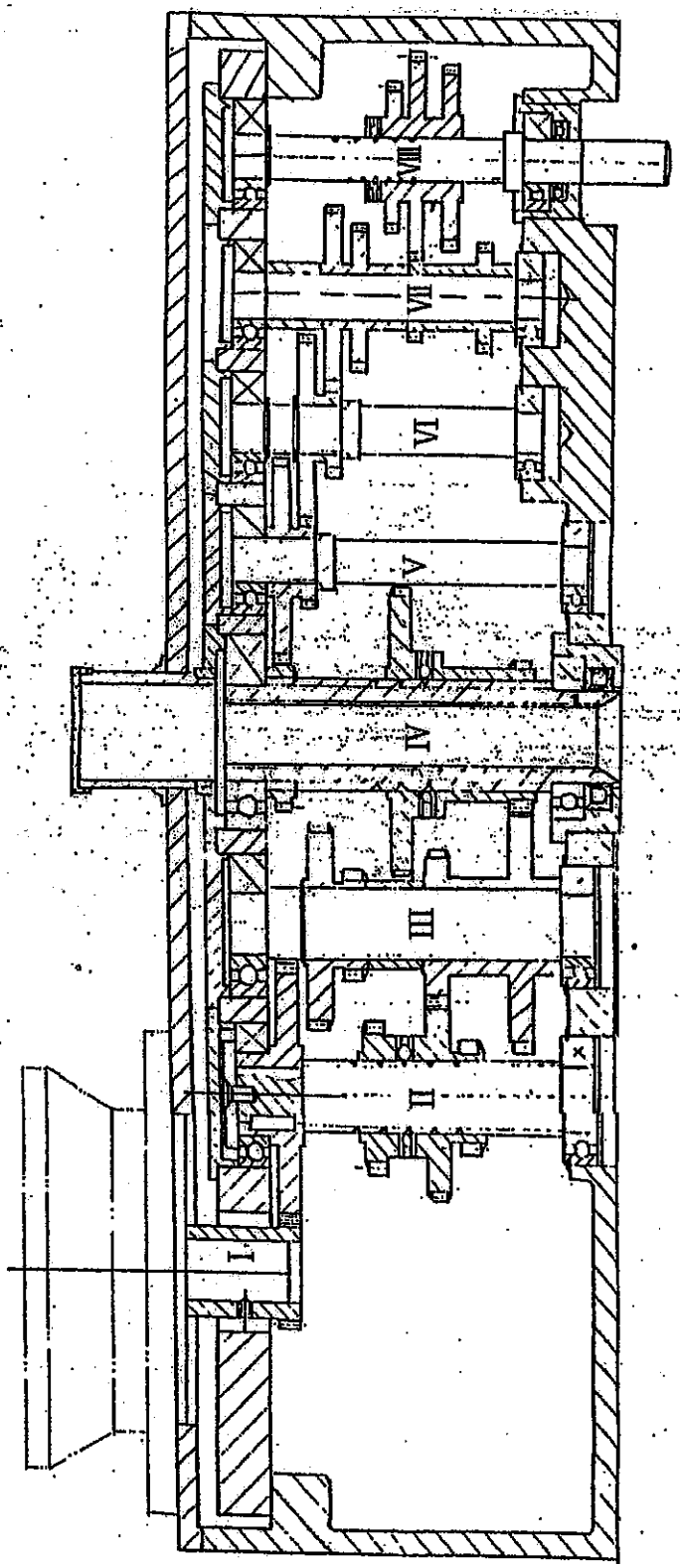


3.3.1 Rolling bearing diagram

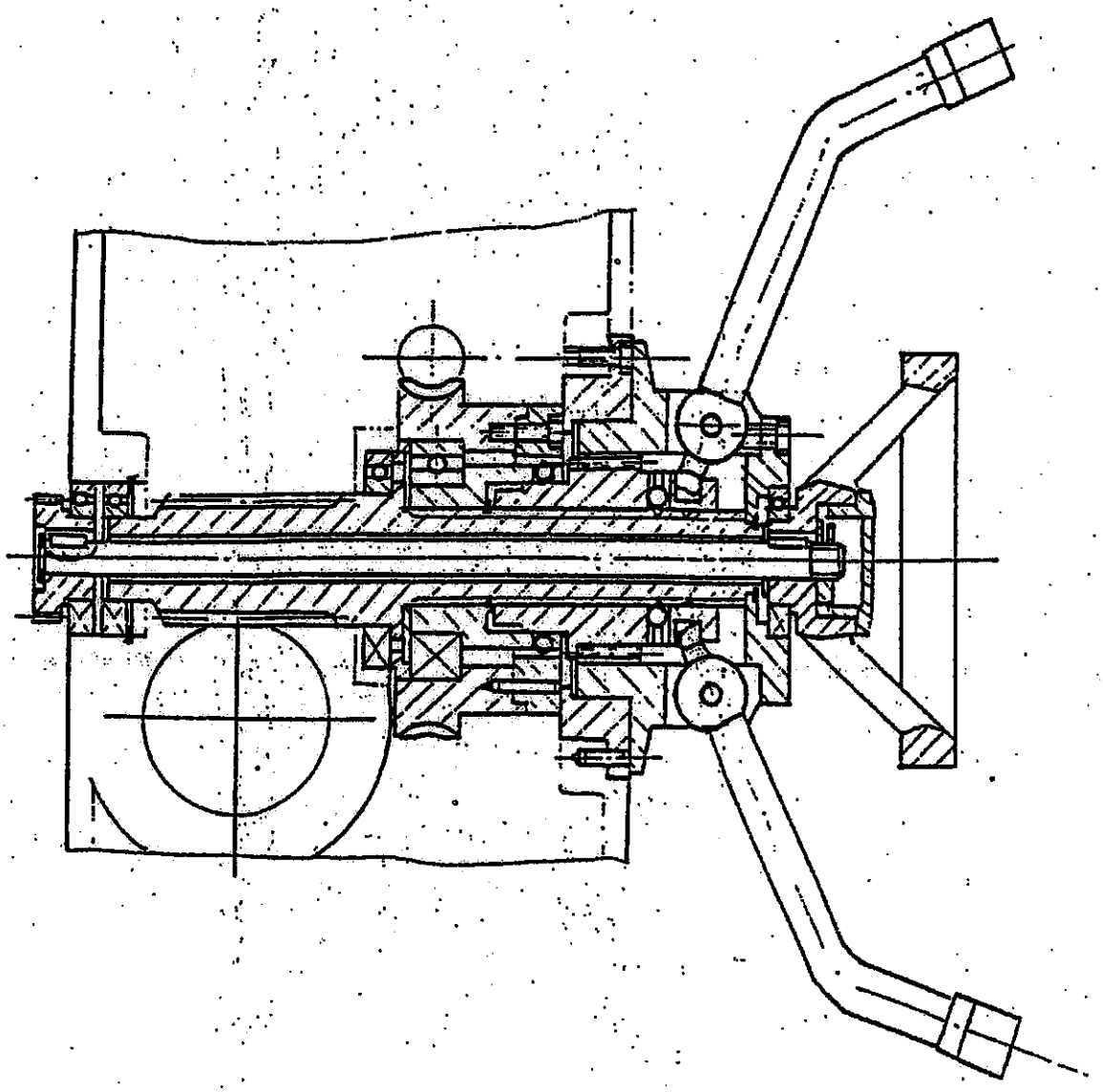
No.	Item	Specification	Precision	Quantity
1	6007	35×62×14	G	1
2	6205N	25×52×15		2
3	6305	25×62×17		1
4	6208	40×80×18		1
5	6204	20×47×14		4
6	6008	40×68×15		1
7	6203N	17×40×12		1
8	6004	20×42×12		1
9	6205	25×52×15		2
10	6203	17×40×12		1
11	51203	17×35×12		1
12	6003	17×35×10		1
13	51106	30×47×11	D	2
14	6006	30×55×13		3
15	16005	25×47×8	G	1
16	6009	45×75×16		4
17	16008	40×68×9		1
18	6202	15×35×11		1
19	511205	25×47×15		2
20	6011	55×90×18		1
21	51111	55×78×16		2
22	51110	50×70×14		1
23	6205N	25×52×15		2
24	6205	25×52×15		2
25	6206	30×52×16		1

Ⅳ、Main structure and adjust

4.1 Spindle and feeding speed change structure



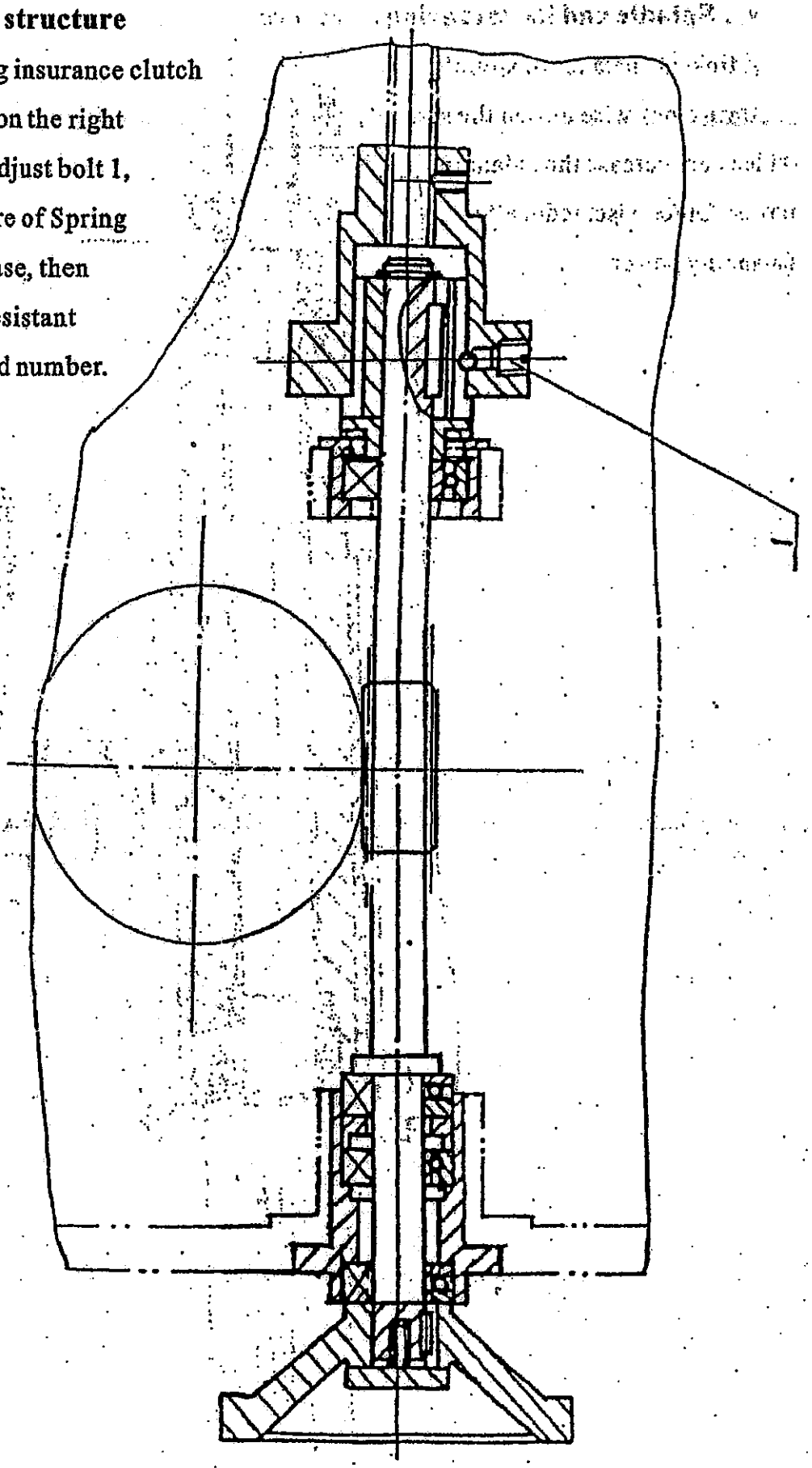
4.2 Horizontal shaft structure



4.3 Worm shaft structure

Adjust the feeding insurance clutch

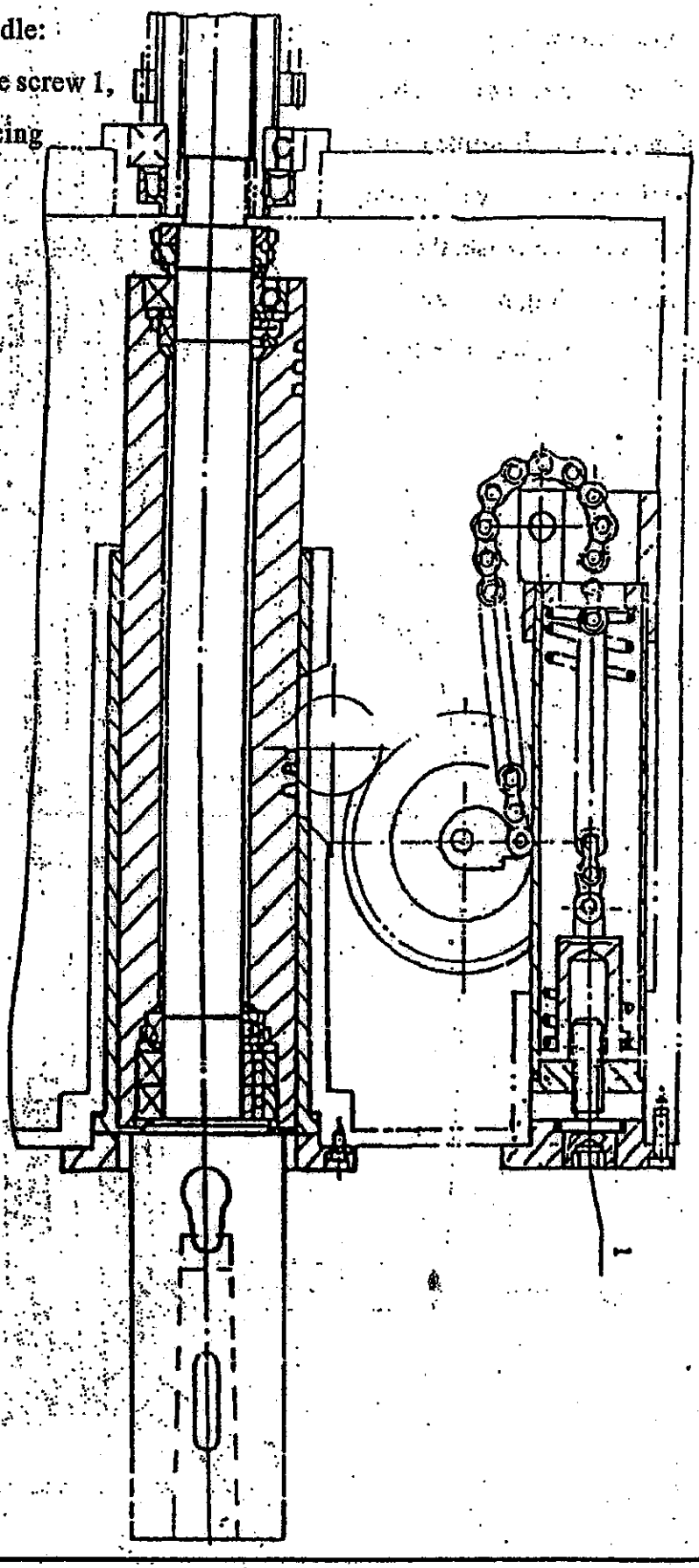
Open the cover on the right of spindle head, adjust bolt 1, enable the pressure of Spring increase or decrease, then spindle feeding resistant power to a allowed number.



4.4 Spindle and its balancing structure

Adjust the balance of spindle:

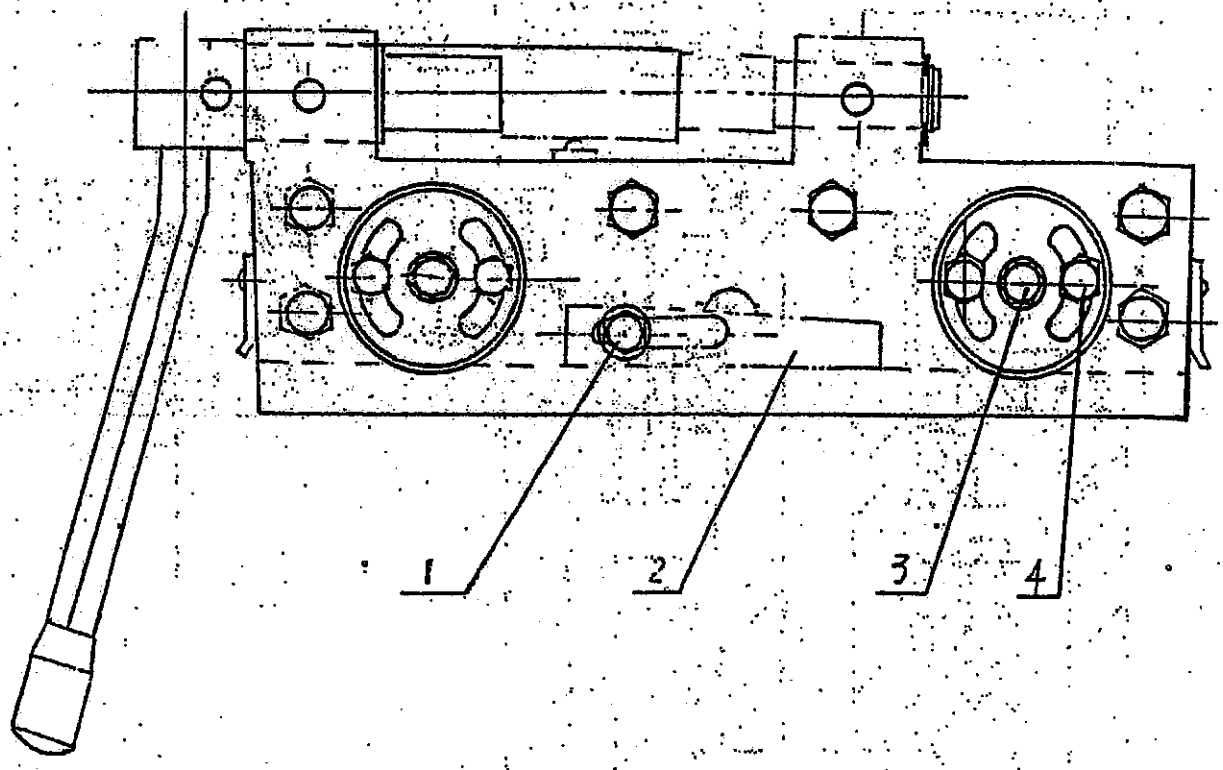
Unti-clock wise loosen the screw 1, which can increase the balancing power. Other wise, reducethe balancing power.



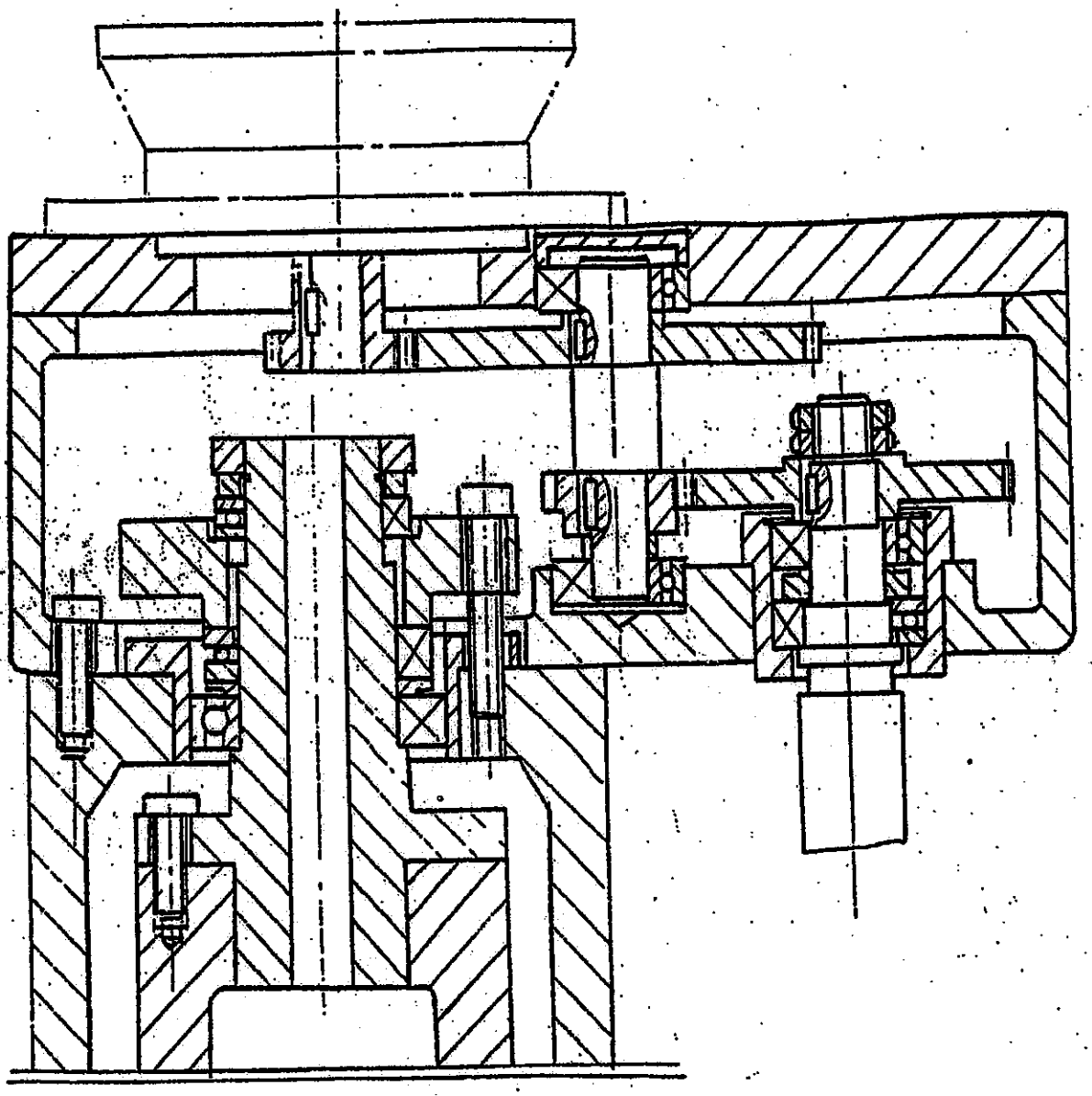
4.5 Head clamping structure

Adjust the head clamping power

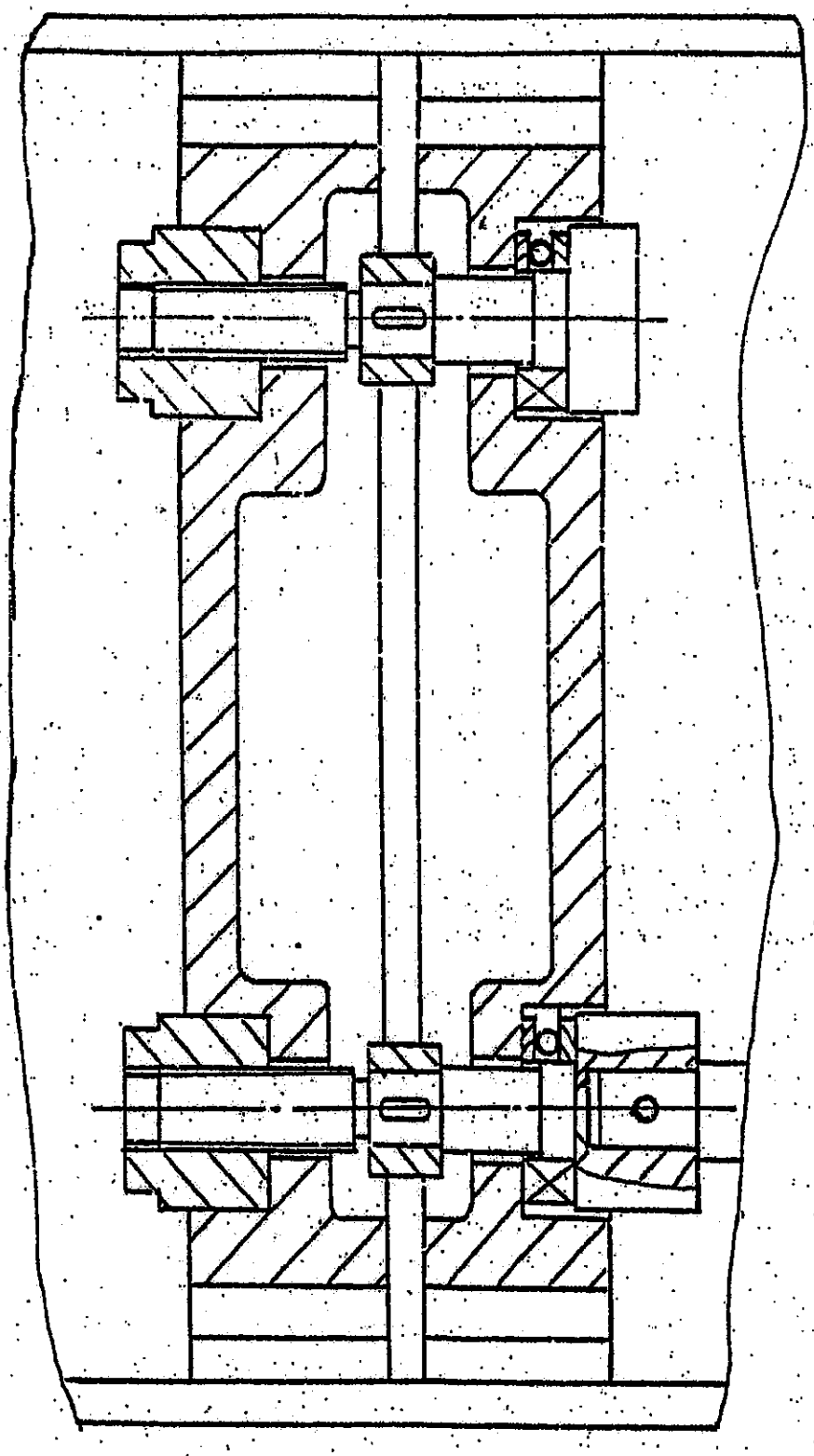
Loosen the nut 1 and remove the part 2, which can adjust the power of head clamping. Generally speaking, put the 300N on the hand wheel, the head can't shake.



4.6 Column arm up and down



4.7 Arm and clamp



V 、Electric system

1. Brief

This machine use 380V、50HZ 3 three phase alternating current, depending on special Needs, also can use other three phase alternating current such as 220V、50HZ、380V、60HZ、420V、50HZ、220V/440V、60HZ and so on. Control circuit and illume circuit was used by control transformer which reduce the pressure, the voltage is 110V、24V fitted for all kinds of electric component, are all listed on the detailed electric component list.

In order to drive all mechanism, motors installed on the machines are as follows.

M1……general motor

M2……up and down motor

M3……cooling pump motor

Switchboard is on the under-front of column, cooling pump motor is equipped on the base, column clamping motor installed on top of the column, other electric equipment on spindle body or arm. Because there is no junction station on top of the column, so do not always turn the arm continuously to a direction when in opcration, in order twist off line Which cross the inner the column.

2. Explain of circuit

(Figure5-1 Electric principle map, Figure5-2 Electric wiring diagram)

(1) Turn on the electricity switch SAI, indicator light HL 1 and button indicator light HL2 HL3 connected.

(2) general motor circumgyrate

press start button SB2, turn on the contactor KM1, then spindle circumgyrate clockwise indicator light HL2 off press button SB3, contactor KM2 connected, spindle circumgyrate unti-clockwise, indicator light HL3 off Spindle stopped circumgyrate when press button SB4 In prevent of long time operation about general motor, there is a relay FR, it's fixed value should adjust by the rating current of general motor M1.

(3) Arm up and down

First release the arm clamping handle 3, micro-switch SQ1 closed, press uplift (or down) button SB5(or SB6). contactor KM2(or KM3)absorbed, up and down motor M2 circumgyrate, drive the arm uplift. When arm Uplift(or down) to the places yoou needed, loose button SB5(or SB6)contactor KM3(or KM4)released, up and down motor M2 stopped circumgyrate. Arm stopped up and down.

Up and down limitation switch SQ2, SQ3 use to control the arm up and down. Arm stopped when uplift to the limitation place SQ2(or SQ3), contactor KM3(or KM4) off, up and down motor M2 stopped circumgyrate. Arm stopped up and down.

(4) Start and stop of the cooling pump.

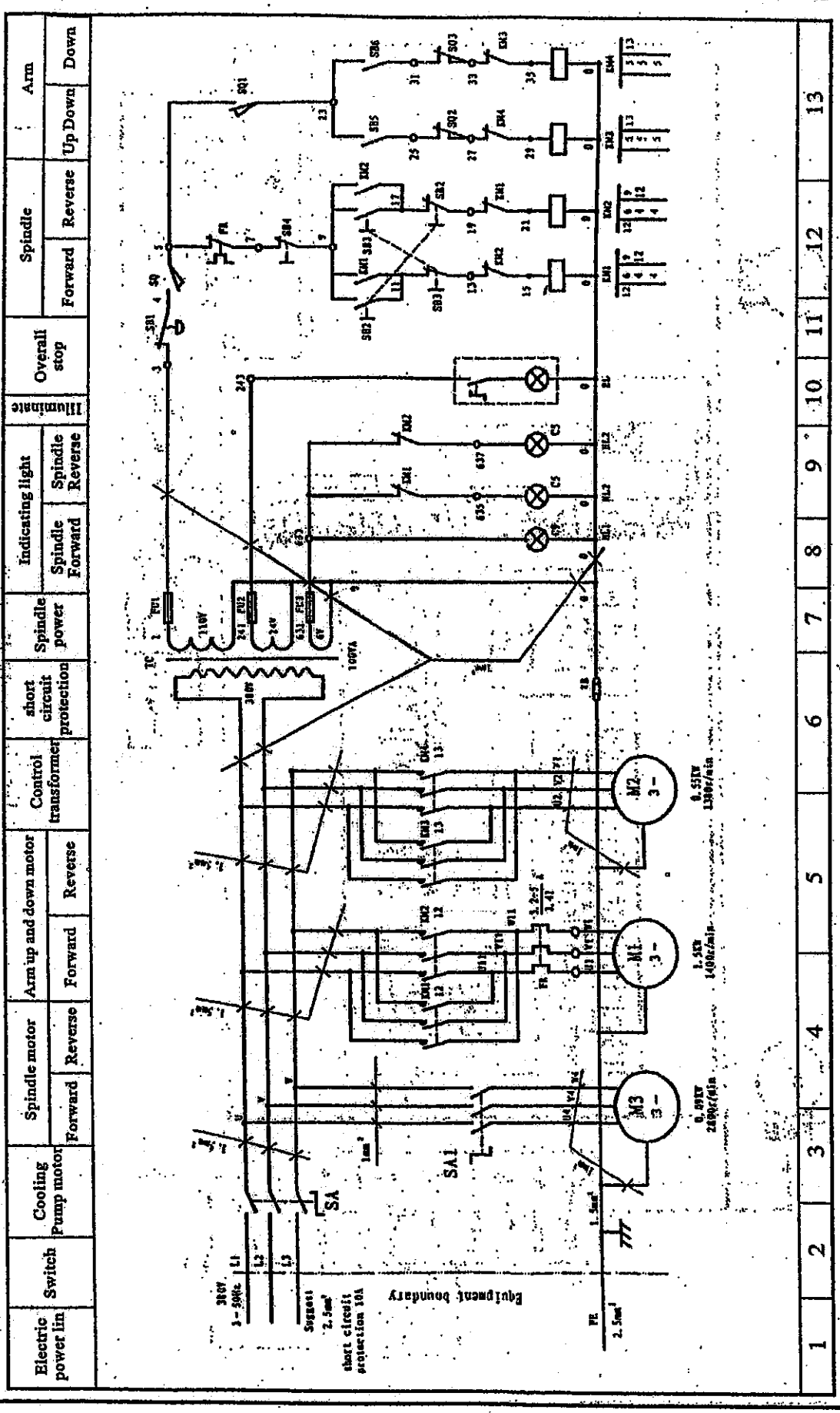
You can connect or cut off the electricity by turn the combination switch to the start/stop position Then the cooling pump motor M3 start and stop.

3. Maintainance of the electric equipment

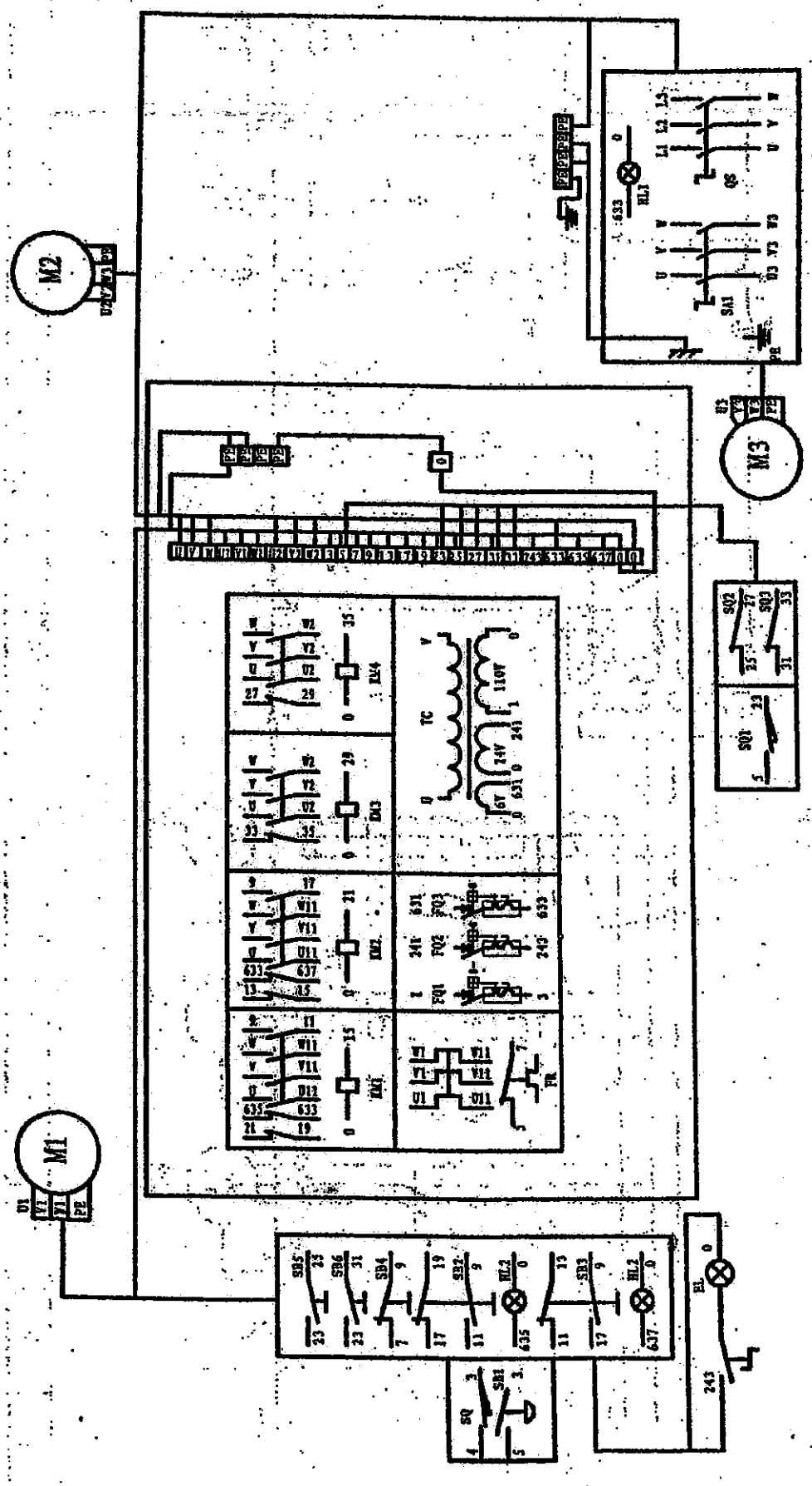
When check up with the electric equipment, you must make sure that the general electricity has turned off.

In order to keep electric equipment clean, you must clear the dust, dirty things and oil after a time. You can use blower clean dust but do not use kerosene、gasoline to clean winding. contact place must clean clearly, change another one if fraied. Slightly burned or frayed contact head should be repaired by file.

* When spindle interchanged clockwise and unti-clockwise, you need to press button SB4 and then press SB3 (or SB2) if unnecessary.



Electric principle map

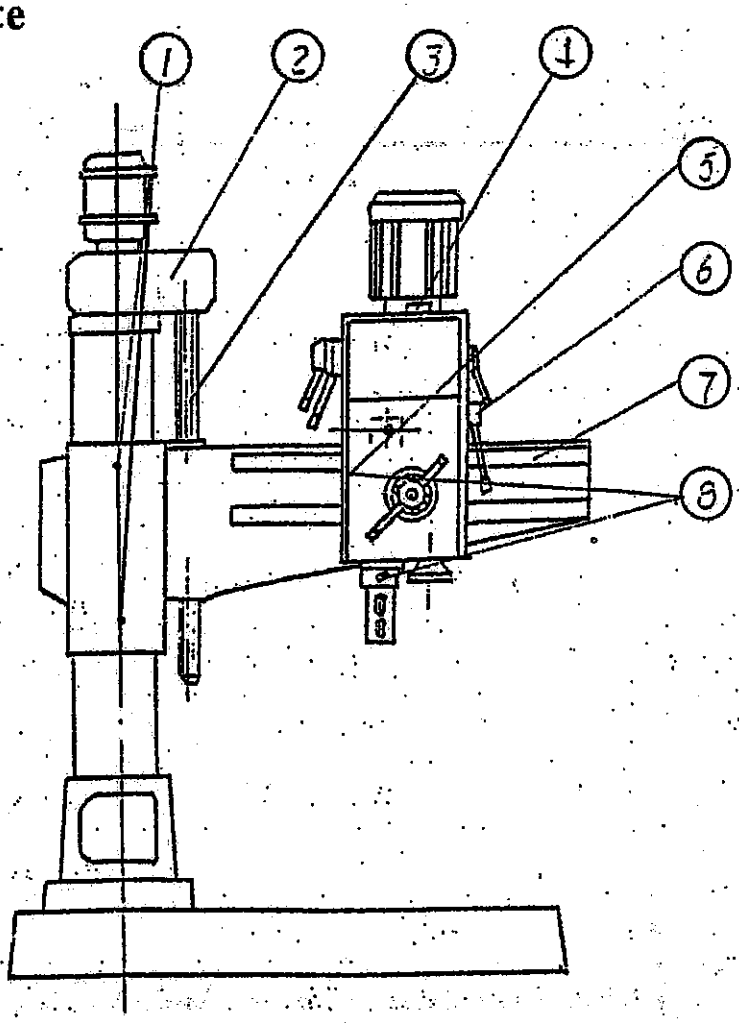


Electric wiring diagram

Detailed electric parts list

No.	Symbol	Qty	Specification and model	Name	Remarks
1	M1	1	1.5KW, Y900L1-4, B5	three phase motor	
2	M2	1	550W, Y8014,B5	three phase motor	
3	M3	1	90W,OB-25	Cooling pump motor	With pump
4	QF1	1	DZ47C1-1P	breaker	
5	QF2	1	DZ47C3-2P	breaker	
6	TC	1	JBK3-100( )/110,24,6V	Control transformer	( )depend on rating voltage
7	KM1-KM4	4	3TB4022,110V,50-60Hz	contactor	
8	FR	1	TGR36-20	Heat relay	
9	SQ2,SQ3	2	LXW5-11GZ	Micro-switch	
10	SQ1	1	LXW10-E1	Micro-switch	
11	SA	1	HZ5-10/1,7LO2	Combination switch	
12	SB1	1	LAY3-01ZS/1red	Control button	
13	SB2,SB3	2	LAY3-11D/2green	Control button	
14	SB5,SB6	2	LAY3-11P/6black	Indicator light	
15	SB4	1	LAY3-01P/1red	Indicator light	
16	HL	1	XD, faucet 6V	Switch of door	
17	EL	1	40W, 24V	bulb	
18		1	JC40A-1	light	
19	QS	1	GLD11-25/04	Switch	
20	QS1	1	HZ5D-20/4L02	Switch	

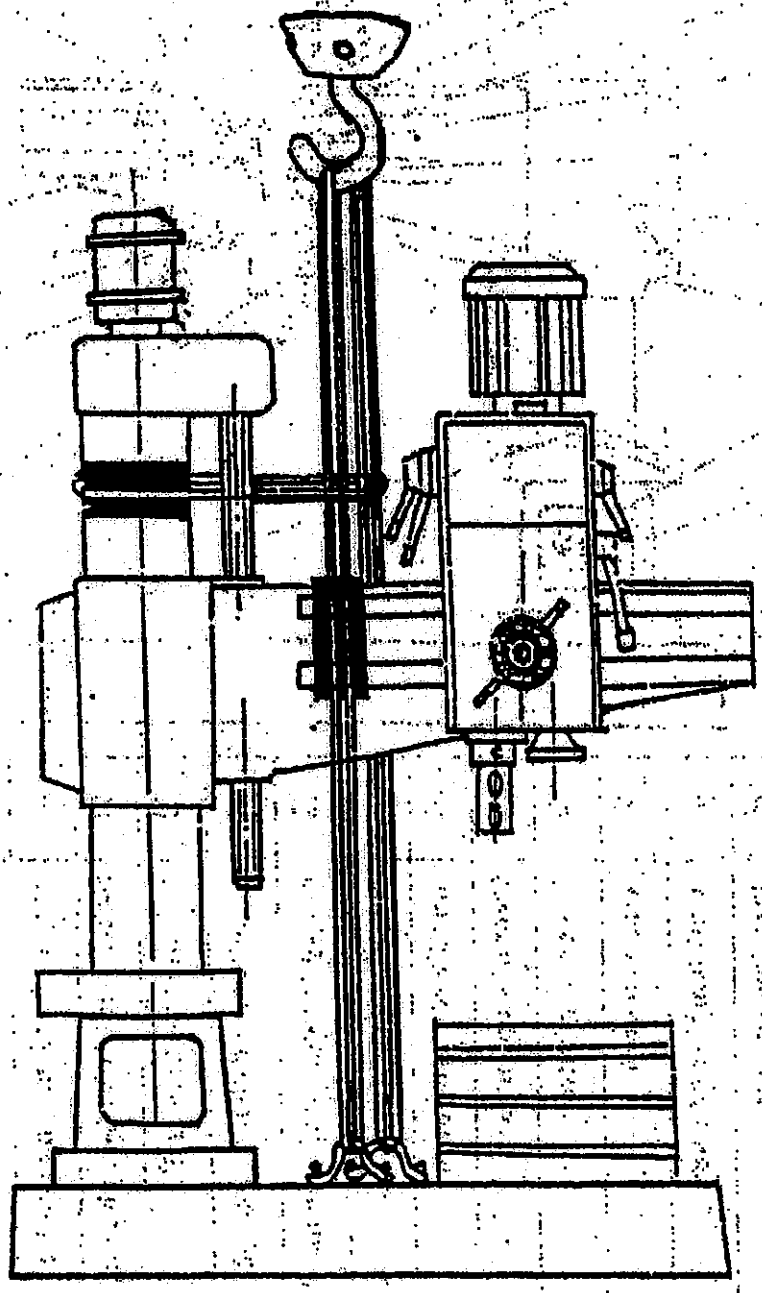
Ⅵ、Lubricate



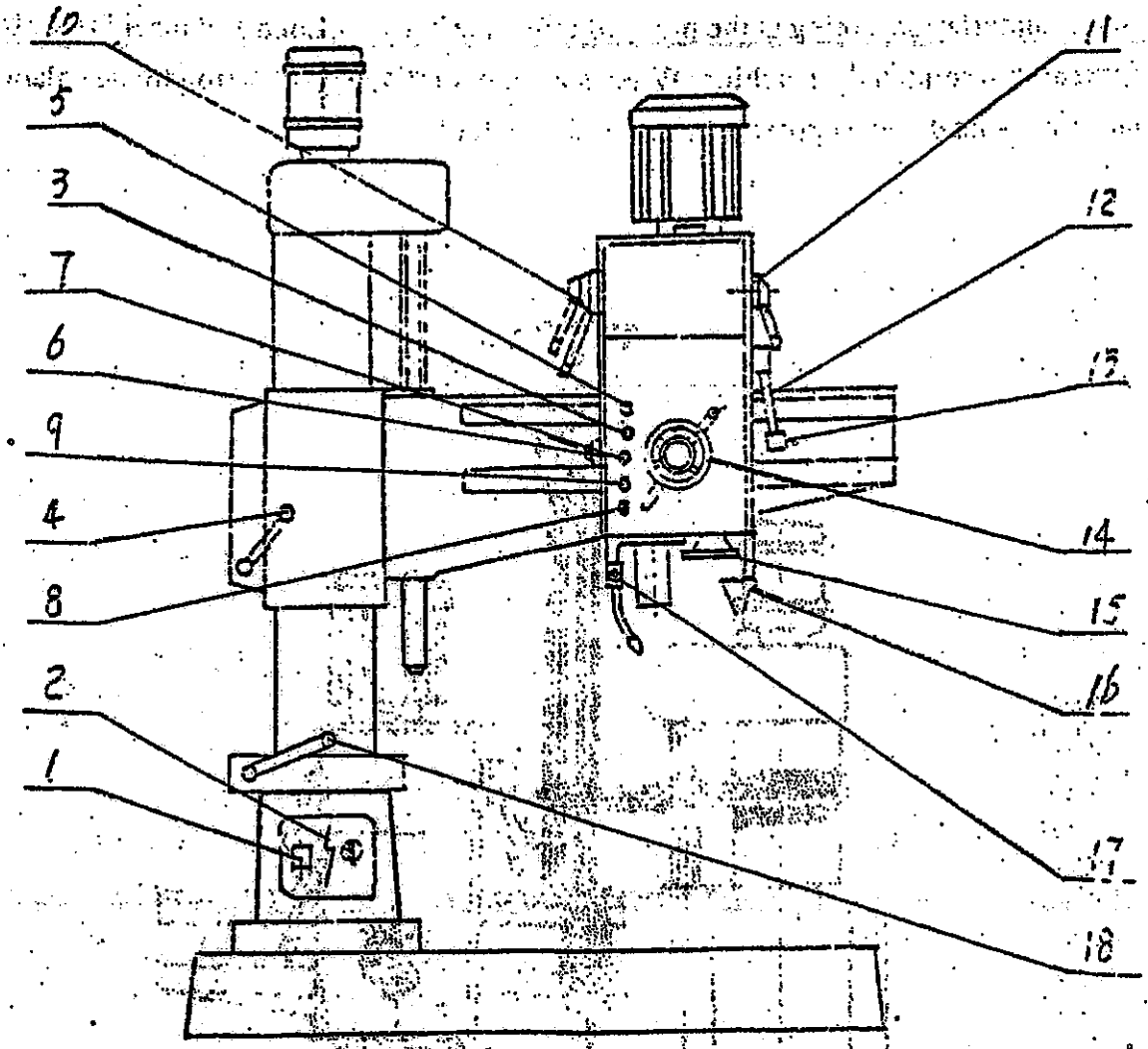
No	Lubricate part	lubricating oil No	Lubricate circle	Remarks
1	Spindle guide	68# machinery oil	Always keep oiling	
2	Up and down gear box	3# lubricate grease	Injecting oil three month one time	
3	Radial up and down thread bar	68# machinery oil	Injecting oil every time	
4	Spindle injecting oil hole	32# machinery oil	Change oil three month one time	
5	Downstairs of spindle head body	3# Lubricate grease	Change oil six monto one time	
6	Spindle head bosy clamp equipment	32# machinery oil	Injecting oil every time	
7	Radial guide	68# machinery oil	Always keep oiling	
8	Spindle up and down bearing	2 Lubricate grease	Injecting oil every month	

Ⅶ、Moving and assemble of the machine

Do not make the packing case slant when moving. When remove the trunk, you'd Better underlay soft thing at the place of interface between coed and machine surface, for fear that scratch the machine. When suspend totally, pay attention to the balance of machine. And do not suppress the cover of the door.



Ⅷ、Operation of the machine



Part	The name of the operation part
1	General electricity switch
2	Cooling pump switch
3	Arm down button
4	Arm clamping handle
5	Arm up button
6	Motor stop button
7	Overall stop button
8	Spindle reverse button
9	Spindle change button
10	Fixing cutting limitation handle
11	Spindle speed change handle
12	Spindle moving handle
13	Spindle head clamping handle
14	Spindle head moving handle
15	Slight feeding hand-wheel
16	Illumination switch
17	Cooling liquid switch
18	Column clamping handle

1. Start of machine

Turn on the electricity 1, every part is connected, make preparation for all parts.

2. Spindle circumgyrate clockwise and unti-clockwise and stop.

Press spindle circumgyrate clockwise button 9, spindle circumgyrate clockwise, press General motor stop button 6, spindle stopped circumgyrate, Press spindle Circumgyrate unti-clockwise button, spindle circumgyrate unti-clockwise.

3. Spindle speed change

Operating the spindle speed change handle 10, put the handle to the position of speed You needed on the plate,press spindle circumgyrate clockwise and unti-clockwise button again, then spindle circumgyrate clockwise and unti-clockwise.

4. Feeding speed change

Operating the feeding speed change handle 11, push the handle to the position on the Plate you needed, then you can change the feeding speed.

5. The empty block of spindle

Take the spindle speed change handle 10 to the "0" position, then you can turning the Spindle easily by hand. Notice; You must stop before change the speed.

6. Spindle feeding

Organism feeding---pull the Handle 12 out, then spindle feeding automatically.

Manual work feeding---push the Handle 12 in and turning handle 12, it can let the spindle accessing up and down.

Slight feeding---Let the feeding speed change Handle 11 to the "0" position and pull Handle 12 out, turning the Handle 19 and then slight accessing.

Notice: Do not exceed the limitation position of up and down distance When spindle feeding (spindle distance 240mm), otherwise plain axis Easily destroied.

Ⅸ、Accessories、spare part and fragile part

a、Accessories

No.	Specification and model		Name	Quantity
1	3200011C		Case shape worktable	1
2	M16	J11-1	Hex. Hd. Screw	4
3	M20	J11-1	Hex. Hd. Screw	4
4	M20	J11-3	Thick Hex. Hd. Screw	4
5	M20×400	J23-8	Base bolt	4
6	M16×70	J29-1	T slotted bolt	4
7	M20×100	J29-1	T slotted bolt	4
8	16	J51-1	Washer	4
9	20	J51-1	Washer	8
10	4	SZS81-1	Drift	1
11	18	SZSS81-2	Wrench	1
12	Φ16mm		Chuck	1
13	MT3/MT2		Arbor	1
14	MT4/MT3		Arbor	1
15	MT4/B18		Arbor	1

⚠WARNING

General Machinery Safety Instructions

Machinery House
requires you to read this entire Manual before using this machine.

1. **Read the entire Manual before starting machinery.** Machinery may cause serious injury if not correctly used.
2. **Always use correct hearing protection when operating machinery.** Machinery noise may cause permanent hearing damage.
3. **Machinery must never be used when tired, or under the influence of drugs or alcohol.** When running machinery you must be alert at all times.
4. **Wear correct Clothing.** At all times remove all loose clothing, necklaces, rings, jewelry, etc. Long hair must be contained in a hair net. Non-slip protective footwear must be worn.
5. **Always wear correct respirators around fumes or dust when operating machinery.** Machinery fumes & dust can cause serious respiratory illness. Dust extractors must be used where applicable.
6. **Always wear correct safety glasses.** When machining you must use the correct eye protection to prevent injuring your eyes.
7. **Keep work clean and make sure you have good lighting.** Cluttered and dark shadows may cause accidents.
8. **Personnel must be properly trained or well supervised when operating machinery.** Make sure you have clear and safe understanding of the machine you are operating.
9. **Keep children and visitors away.** Make sure children and visitors are at a safe distance for you work area.
10. **Keep your workshop childproof.** Use padlocks, Turn off master power switches and remove start switch keys.
11. **Never leave machine unattended.** Turn power off and wait till machine has come to a complete stop before leaving the machine unattended.
12. **Make a safe working environment.** Do not use machine in a damp, wet area, or where flammable or noxious fumes may exist.
13. **Disconnect main power before service machine.** Make sure power switch is in the off position before re-connecting.
14. **Use correct amperage extension cords.** Undersized extension cords overheat and lose power. Replace extension cords if they become damaged.
15. **Keep machine well maintained.** Keep blades sharp and clean for best and safest performance. Follow instructions when lubricating and changing accessories.
16. **Keep machine well guarded.** Make sure guards on machine are in place and are all working correctly.
17. **Do not overreach.** Keep proper footing and balance at all times.
18. **Secure workpiece.** Use clamps or a vice to hold the workpiece where practical. Keeping the workpiece secure will free up your hand to operate the machine and will protect hand from injury.
19. **Check machine over before operating.** Check machine for damaged parts, loose bolts, Keys and wrenches left on machine and any other conditions that may effect the machines operation. Repair and replace damaged parts.
20. **Use recommended accessories.** Refer to instruction manual or ask correct service officer when using accessories. The use of improper accessories may cause the risk of injury.
21. **Do not force machinery.** Work at the speed and capacity at which the machine or accessory was designed.
22. **Use correct lifting practice.** Always use the correct lifting methods when using machinery. Incorrect lifting methods can cause serious injury.
23. **Lock mobile bases.** Make sure any mobile bases are locked before using machine.
24. **Allergic reactions.** Certain metal shavings and cutting fluids may cause an ellergic reaction in people and animals, especially when cutting as the fumes can be inhaled. Make sure you know what type of metal and cutting fluid you will be exposed to and how to avoid contamination.
25. **Call for help.** If at any time you experience difficulties, stop the machine and call you nearest branch service department for help.

⚠WARNING

Drilling Machine Safety Instructions

Machinery House
requires you to read this entire Manual before using this machine.

1. **Maintenance.** Make sure the Drill is turned off and disconnect from the main power supply and make sure all moving parts have come to a complete stop before any inspection, adjustment or maintenance is carried out.

2. **Drill Condition.** Drill must be maintained for a proper working condition. Never operate a Drill that has damaged or worn parts. Scheduled routine maintenance should performed on a scheduled basis.

3. **Leaving a Drill Unattended.** Always turn the Drill off and make sure all moving parts have come to a complete stop before leaving the Drill. Do not leave Drill running unattended for any reason.

4. **Avoiding Entanglement.** Remove loose clothing, belts, or jewelry items. Never wear gloves while machine is in operation. Tie up long hair and use the correct hair nets to avoid any entanglement with the Drill spindle or moving parts.

5. **Chuck key & wrench safety.** Always remove chuck keys, wrenches and any service tools immediately after use. Chuck keys left in the chuck can cause serious injury.

6. **Understand the machines controls.** Make sure you understand the use and operation of all controls.

7. **Drill bit selection.** Always use the correct Drill bit for the job you are Drilling. Make sure you use the correct shank drill bit for you drilling machine.

8. **Secure the Drill Bit.** Properly tighten and securely lock the drill bit in the chuck.

9. **Cutting Tool inspection.** Inspect Drill for sharpness, chips, or cracks before use. Replace any cutting tools immediately if dull, chipped or cracked. Handle new cutting tools with care. Cutting edges are very sharp and can cause lacerations.

10. **Reversing the spindle.** Make sure the spindle has come to a complete stop before changing the direction of the spindle.

11. **Stopping the spindle.** Do not slow or stop the spindle by using you hand.

12. **Speed selection.** Select the appropriate speed for the type of work, material, and tool bit. Allow the Drill to reach full speed before beginning a cut.

13. **Changing Belts for speed selection.** Always allow the machine to come to a complete stop and turn power off before changing belts. Not turning power off when changing belts can cause serious injury.

14. **Clearing chips.** Always use a brush to clear chips. Never clear chips when the drill is running.

15. **Power outage.** In the event of a power failure during use of the drill, turn off all switches to avoid possible sudden start up once power is restored.

16. **Clean work area.** Keep the area around the drill clean from oil, tools, chips.

17. **Surface/workpiece area.** Before turning the drill on, make sure the table is clear of any objects (tools, scraps, off-cuts etc.) Do not drill material that does not have a flat surface. unless a suitable support is used.

18. **Table Lock.** Make sure the table is tightened before starting the drill.

19. **For - Radial Drill Arm Lock.** Make sure the arm is locked before leaving or starting a radial arm drill. An unlocked radial drill arm can swing and cause serious injury.

20. **Drilling Sheet metal.** All sheet metal should be clamped to the table before drilling.

21. **Mounting workpieces.** Use clamps or vices to secure workpiece before drilling. Position work so you avoid drilling into table.

22. **Guarding.** Do not operate the drill when chuck guard is removed.

23. **Eye and hand protection.** A face shield with safety glasses is recommended. Always keep hands and fingers away from the drill bit. Never hold a work[piece in your hand while drilling. Do not wear gloves while operating the drill.

24. **Drill operation.** Never start the drill with the drill bit pressed against the workpiece. Feed the drill evenly into the workpiece. Back the drill out of deep holes. Turn the machine off and clear chips and scrap pieces with a brush. Turn power off, remove drill bit, and clean the table before leaving the machine.

25. **Call for help.** If at any time you experience difficulties, stop the machine and call you nearest branch service department for help.

PLANT SAFETY PROGRAM

NEW MACHINERY HAZARD IDENTIFICATION, ASSESSMENT & CONTROL

Drilling Machine

Developed in Co-operation Between A.W.I.S.A and Australia Chamber of Manufactures
This program is based upon the Australian Worksafe Standard for Plant(NOHSC:1010-1994)

Item No.	Hazard Identification	Hazard Assessment	Risk Control Strategies (Recommended for Purchase / Buyer / User)
A	ENTANGLEMENT	HIGH	Eliminate, avoid loose clothing / Long hair etc.
B	CRUSHING	LOW	Secure & support work material on drill table.
C	CUTTING, STABBING, PUNCTURING.	MEDIUM	Isolate power to machine prior to any checks or maintenance being carried out. Do not adjust or clean until the machine has fully stopped.
D	SHEARING	MEDIUM	Isolate power to machine when changing speeds or maintenance is being carried out. Make sure all guards are secured shut when machine is on.
F	STRIKING	MEDIUM	Ensure workpieces are tightly secured on machine. Wear safety glasses. For Radial Arm Drills ensure that arm is locked before drilling. Ensure correct spindle direction when drilling..
H	ELECTRICAL	MEDIUM	All electrical enclosures should only be opened with a tool that is not to be kept with the machine. Never clean or dust machine when power is on. Machine should be installed & checked by a Licensed Electrician.
M	HIGH TEMPERATURE	LOW	Wear appropriate protective clothing to prevent hot swarf.
O	OTHER HAZARDS, NOISE.	LOW	Wear hearing protection as required.
Plant Safety Program to be read in conjunction with manufactures instructions			

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Authorised and signed by:
Safety officer: .....
Manager: .....

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