1027.070

OPERATING AND MAINTENANCE INSTRUCTION MANUAL

FOR

2-DIE 2-BLOW COLD HEADERS MODEL "AOT"

CONTENTS

As it is our policy to improve our machines in design and manufacture continuously, and due to machine variations and differences resulting from machine sizes, some illustrations in this manual may differ slightly from the machine you have. However, the instructions are suitable for this series of the machines.

1. OUTLINE OF MACHINE

AOT 2-die 2-blow headers are designed under new idea of Asahi-Okuma to provide ideal forming of products to the customers.

The 2-die 2-blow system enables to provide our customers, not only with forming tubular and shoulder rivets by improving the shape of the die on forging and extruding, but also with long performance of tool life, easy adjustment of punch alignment and kickout timing.

The transfer movement from the first die to the second die is ensured firmly by a positive cam which minimizes improper movement. One stroke of the punch movement derived from the ram movment lead to one finished product at high speed. Not withstanding simplified mechanism of the machines, these AOT 2-die 2-blow headers perform a very high production capacity.

This instruction manual has been prepared to help you in getting the most out of your Model AOT 2-die 2-blow header. It contains the information necessary for the setup, operation and maintenance of the machine. The correct operating and maintenance procedures must be clearly understood and carefully followed to insure the best results from your machine. This instruction manual should be carefully studied prior to the installation of your machine and should be filed for future reference.

We shall be happy if you will let us have any comments on the equipment as well as any questions on the descriptions and illustrations given herein by addressing to :

ASAHI-OKUMA INDUSTRIAL CO., LTD.

Main office: 5050 Asahimae-cho Owari-Asahi
Aichi-Pref., Japan.
Cable address: ASAHIOKUMA NAGOYA
Telex : 4496058 AOH J

3. UNPACKING

The machine has been carefully assembled and tested prior to shipment from our plant. Should the machine be found to have any defect in materials and workmanship, or discrepancy upon unpacking and checking against the packing list, immediately communicate with your Asahi-Okuma representatives or directly with us to that effect.

4. LIFTING AND INSTALLATION

4.1 Transportation

Open top covers, and four eye-bolts are provided on the top of machine frame for lifting the machine without removing any covers.

4.2 Installation

The machine should be installed in strict accordance with the foundation and installtion floor plans attached to this booklet. Prior to the handling of the machine to a selected zone of ecrection, make certain that the concrete foundation has been properly built, with all necessary markings completed accurately as specified on the foundation plan.

The machine should be carefully levelled up, with a precision spirit level placed on top of the machine. The machine base is anchored to the concrete foundation. Cement or mortar should be poured in each foundation bolt hole, and after it has been made certain to have "set" enough, proceed with the tightening of the nut on each foundation bolt, and then with the final levelling-up the machine.

4.3 Electrical power connection

An incoming power supply cable should be connected to the machine with reference to the electrical drawings suppied together with the machine.

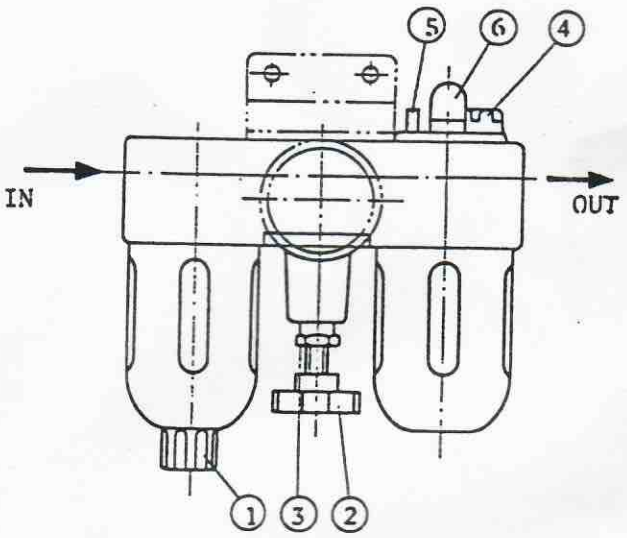
For correct phasing, make sure that the machine runs in the correct direction. The correct direction of the machine (or flywheel) rotation is clockwise as viewed from the normal operator's position. If it operates in a wrong direction, interchange two of the three phase lines at the incoming power terminals.

4.4 Air piping

The inlet airl ine hose joint is located at the left-hand side near front of the machine. An appropriate 1/4" size air supply bubber hose should be connected and tightened to the joint with a hose bank.

Shop air supply should be between 5 - 7 kg/cm^2. Air-operated components are:

Feed on-off oscillating acuator,
Brake in feed mechanism,
Feed roll press cylinder (on Model AOT-8, 10, 12B).



(a) Air filter

1) Before the water condensed from vapor in air has reached the upper limit yellow line level, stop the operation of the machine and remove it from the air filter through the drain valve (1) into a drain pan prepared.

2) Be sure to tighten the valve before supply of compressed air into the machine.

(b) Pressure regulator

1) Adjust the pressure regulator to the setting of 5kg/cm^2 on the pressure gauge reading. Turn the adjusting screw knob (2) clockwise to increase the setting pressure.

2) Be sure to tighten the lock nut (3) on the adjusting screw.

(c) Lubricator

The oil-mist lubricator feeds air-laden lubricant particles without any interuption of air supply.

A guide to select air line lubricant;

These oils may be used in the air line lubricators serving equipment with synthelic seals.

AMOCO	..... Spindle oil A	Exxon	.... Spinesstic 34
ANTAR	..... Special Continu	Fuchs	.... Relolin MR 3
ARAL	..... Oel CMT	Gulf	.... Gulfspin 35
ATLANTIC	..... Duro 55	METAL LUB	... Melspin # 5
BP	..... Energol HLP40	MOBIL	.... Velocite Oil #6
CALYPSOL	..... Bison Ole SR	SHELL	.... Tellus oil 15
CASTROL	..... Hyspin AWS 10	SUN OIL	.... Sunvis 907
CHEVRON	..... Spindle oil 10	TEXACO	.... Spintex 60
ESSO	..... Spinesso 10		

Remove the filler plug (4) and the fill the lubricator with clean oil up to a Max. level indicated. Be sure to add oil before the oil reaches the Min. level.

Turn the needle valve adjusting screw (5) counter clockwise to increase the flow oil being supplied. Observe the drops passing through the sight glass dome (6) on top of the lubricator.

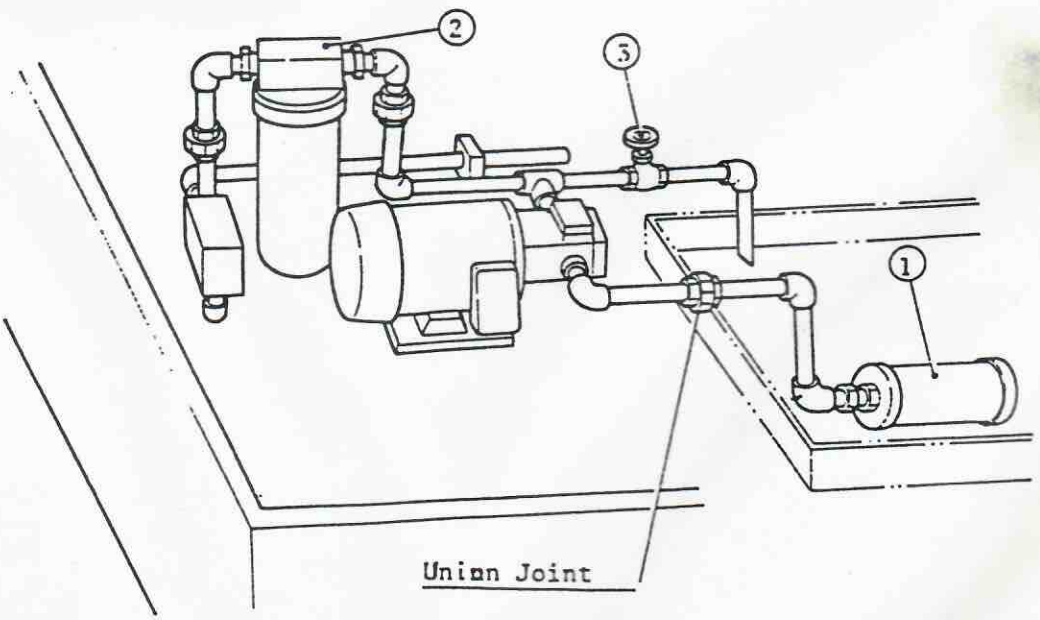
5. LUBRICATION

5.1 Lubrication system

The machine has been engineered and built with utmost care taken of proper lubrication, the key to the satisfactory performance and long life of the machine.

Lubrication is made by pressure or forced-feed, oil cups and grease fittings. The vital components of the machine are lubricated by the pressure-type circulating oil system.

In this system, a protective pressure siwtch is to be set to its operating oil pressure of 1.0 kg/cm^2. When during operation the pressure of the lubricating oil falls below 1.0 kg/cm^2, the pressure switch open the power circuit to the oil pump motor so that the light marked "OIL PUMP" on the control panel is extinguished and the machine is brought to a stop at the same time.



Forced lubrication system is adopted to the main parts of machines. The oil reservoir is located at the front side of the machine, and the tank capacities for AOT machines are as follows:

AOT - 4B	... 55 litre	AOT - 6B	... 75 litre
AOT - 8B	...110 litre	AOT -10B	...140 litre
AOT -12B	...180 litre		

In the oil reservoir a magnetic micro-separator is provided to remove iron dusts. The lubricant oil transfered to each parts of the machine, through a suction filter (100 mesh) (1), a pump relief valve (3) and a line filter (75 mesh) (2) as in the sketch.

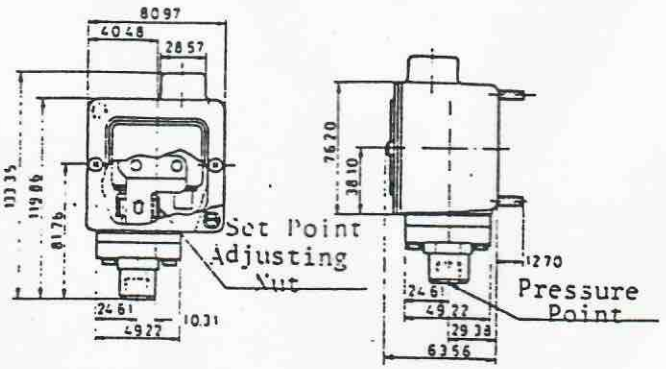
Adjust the oil pressure with relief valve (3) to show the gauge pressure 2 kg/cm^2. When the handle of the valve is turned to right, the pressure goes up, and vice versa. Adjust the pressure not exceeding 5 kg/cm^2 to prevent the pipi from oil leakage.

5.2 Pressure Switch

The pressure switch is well-adjusted at the plant in advance of shipment. Do not adjust the pressure switch at your end. When the adjustment is needed see the adjustment instruction and figure below

ADJUSTMENT INSTRUCTION

Pressure set point: Turn self locking adjustment nut clockwise; counter-clockwise to lower.



The following are supposed to be the reasons when the oil pressure does not increase to the required level. Take the ncessary steps according to the below instructions.

a) Oil quantity is improper	.... Supply new oil.
b) Oil pump and motor are damaged	.... Change them with new ones.
c) Oil leakage from pipe	.... Exchange the pipe or fasten the joint firmly if necessary.
d) Suction filter is clogging	.... Remove the filter and clean it with air.
e) Line filter is clogging	.... remove the filter and clean it with air.

5.3 A guide to select lubricating oil

These are basis specifications which we have found to give satisfactory performance. Most major oil companies have a produce meeting or exceeding these requirement and have indicated the following to be such a lubricant.

AOT-10B, L, XL, AOT-12B, L, XL, AOT-16B

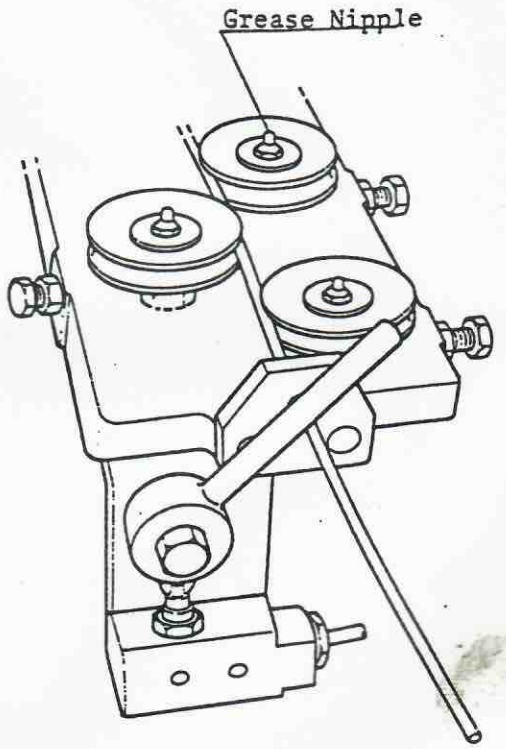
Viscosity Sus at 100°F		300-350
cSt at 40°C		61-68
Shell	Tellus	68
Mobil	Mobil	626
AMCO	WAYTAC	68
METALUB	MELCOLUBE	101-CP

5.4 Charging oil cups

Supply oil to the cups on top of the backplate of the die-block from time to time.

5.5 Charging grease fittings

Feed grease to the grease nipple on top of the straightener roller shaft from time to time in accordance with the instruction on the machine.



5.6 Oil Maintenance

In order to maintain normal operation of the machine, operator is requested to pay special attention for the ,ubrication. Clean the suction filter, line filter and micro separator from time to time. Also clean the inside of the oil reservoir.

It is absolutely required to extend machine life to clean the inside of the oil reservoir, because foreign matters like tips and bonds accumulate there unavoidably.

When cleaning the suction filter (1) remove the unoin joint which connects it with the lubrication pipe. The cartridge of line filter can be easily removed from the machine by loosening the ring nut placed on top of the line filter.

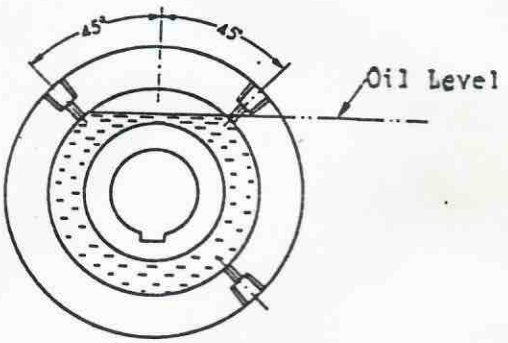
Operator is requested to take off the watch when cleaning the mico - separator which is of high magnetic material.

5.7 Feed cam clutch

Satisfactory performance of feed cam clutch (One-Way Clutch) depends greatly upon proper and effective lubrication. It should be kept in kind that inadequate lubrication causes imperfect engagement, excessive slip and wear which result in noticeable variations in the feed length or the amount of feed roll rotation that occurs during each machine cycle.

The oil should be added every 100 hours or every 2 weeks, whichever comes earlier. The oil tank must be completely flushed away every 3 months, cleaned out with washing or flushing oil, and then filled with new clean oil. It is filled up to the level in the state of the clutch shown in the figurebelow with the oil in volume is as folllows approximately.

Model	Type of clutch	Oil volume
AOT-4B	PMC25X	105 cc
AOT-6B	PMC30X	105 cc
AOT-8B	PMC40X	180 cc
AOT-10B	PMC45X	180 cc
AOT-12B	PMC60X	300 cc



Feed cam clutch lubricant

SAE10-50 viscosity lubricants are recommended. For instance, automatic transmission Fluids(ATF) are excellent. The oil which contains much of extreme pressure and tackiness additives, graphite or molybdenum disulphide should not be used, because it causes slipping of the clutch elements.

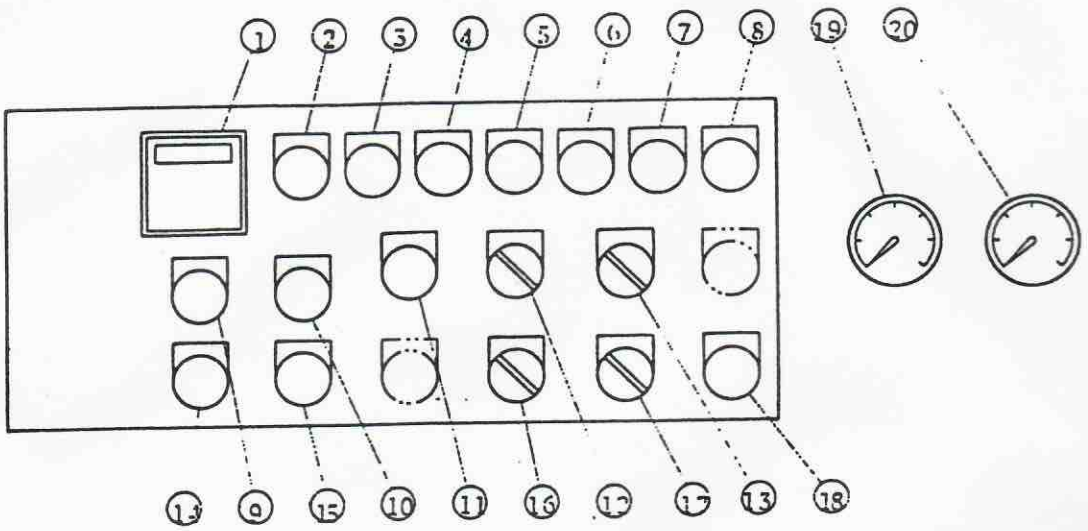
These are basis specifications which we have found to give satisfactory performance.

Shell	.....ATF-Dextron 2	Mobil	..... ATF 200
	.... Rimura CT oil		..... ATF 220
	.... Rimura 2 oil		..... Delvac 1300
	.... Rimura S oil		..... Delvac 1200
			..... DTE 24
			..... DTE 25

6. OPERATION

6.1 Operation of standard model AOT with industion motor

6.1.1



1) Auto Counter
2) Signal Lamp for electrical power "SOURCE ON"
3) Signal Lamp for "LUBRICATION ON"
4) Detector Lamp for "WIRE END OFF"
5) Detector Lamp for "AUTO COUNTER"
6) Detector Lamp for "OVERLOAD"
7) Detector Lamp for "FLYWHEEL COVER OFF"
8) Detector Lamp for "SHORT CUT OFF"
9) Push Button Switch for "LUBRICATION ON"
10) Push Button Switch for "MAIN MOTOR FORWARD ON"
11) Push Button Switch for "MAIN MOTOR REVERSE ON"
12) Select Switch for "JOG/RUN"
13) Select Switch for "WIRE FEEDING OFF/ON"
14) Push Button switch for "ALL STOP"
15) Push Button Switch for "MAIN MOTOR OFF"
16) Select Switch for "SHORT CUTOFF OFF/ON"
17) select swtich for "BRAKE OFF/ON"
18) Push Button Switch for "RESET"
19) Pressure Gauge for Air Line
20) Pressure Gauge for Lubrication System

6.1.2 Operation procedure

Operator is requested to check if the wiring if correctly done according to wiring diagram and if all the fastening bolts and nuts are firmly tightened.

A) Starting Jog Operation

1) Check if the Lamp for electrical power source (2) lights up.
2) Check if each select switch is set as follows;
   (12) for "JOG", (13) for "OFF", (16) for "OFF", (17) FOR "ON".
3) Check if the air pressure gauge shows 5 kg/cm^2.
4) Set the required quantity figures of products to the auto-counter (1). (The machine does not start without any figures.)
5) Depress the button for "LUBRICATION ON" (9). When the oil pressure goes up to the required value, the pressure switch actuates and the lubrication lamp (3) lights up. Check if the oil pressure has reached to 1 - 1.5kg/cm^2.
6) Now the machine is ready for jogging by depressing the button "MAIN MOTOR FORWARDS ON". Check the timing of machine operations, i.e., first transfer, second transfer, second transfer finger open, kickout in die and etc. during the jogging operation. Check the loosing of bolts and nuts to prevent the machine from collision during the operation.

B) Starting No load running operation

7) When a select switch for "MOTOR SPEED LOW-HIGH" is provided, set to the required one of them. No-load running operation can be done by turning the select switch "JOG/RUN" (12) to the position "RUN" while the "MAIN MOTOR FORWARD ON" button (10) is depressed.

C) Starting Production Running Operation

8) Before starting production running, open the valve for air blow on top of the machine frame to avoid double blow of the blank. Check if the wire is fed correctly to the stock gauge through the shearing die and depressed between feed rolls by feed roll control lever provided on top of the feed box (or in the model AOT-8B or larger by feed control lever).
9) If any detectors of (4) (5) (6) (7) (8) and (16) (option) are provided set them all "ON".

10) When any of the detector lamps (4) - (8) lights up, check correspond -ing positions. Resetting is done by depressing the push button for "RESET" (18).

D) Stopping No load running operation

1) Turn the select switch for "BRAKE OFF/ON" (17) to the position "OFF".
2) Depress the push button for "MAIN MOTOR OFF" (15) and wait slowing - down of the machine.
3) When the rotation of the motor is reduced, turn the select switch for "BRAKE OFF/ON" (17) to the position "ON". Then, the machine will be braked and stopped.

E) Stopping Production running operation

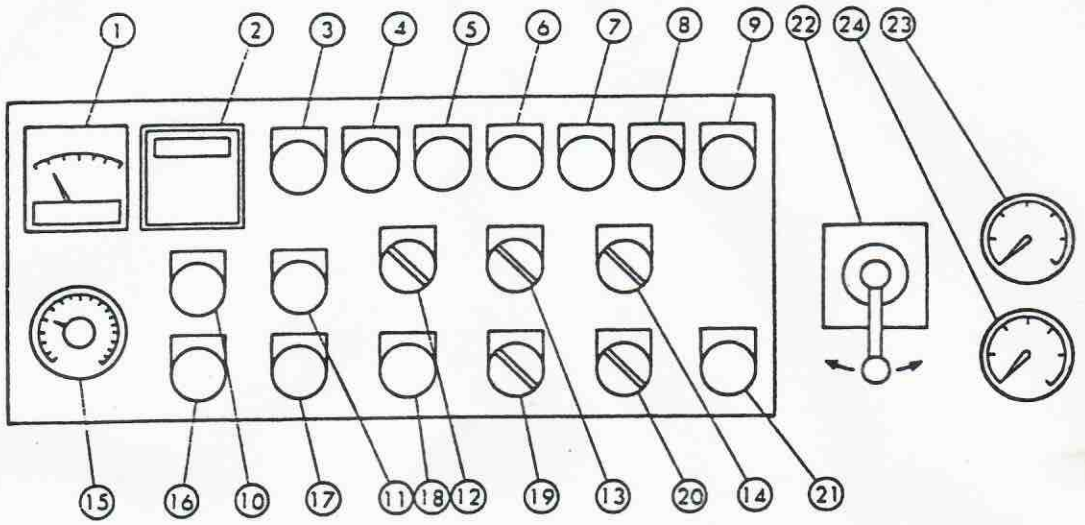
1) If any detectors of (4) - (8) (Option) are provided, all them are to be set to "OFF".
2) Turn the select switch for "BRAKE OFF/ON" (17) to the postion "OFF".
3) Turn the select switch for "BRAKE OFF/ON" (17) to the position "OFF".
4) Depress the push button for "MIAN MOTOR OFF" (15) and wait slowing down of the machine.
5) When the rotation of the motor is reduced, turn the select switch for "BRAKE OFF/ON" (17) to the pisition "ON" and the machine will be stopped.
6) Close the air blow valve on top of the machine frame.

Note:

1) In case of emergency, stop the machine by depressing the push button for "ALL STOP" (14).
2) In case except emergency, stop the machine by the above mentioned operation procedures.

6.2 Opeation of model AOT with VS-Motor (Option)

6.2.1 Control Panel



1) VS-motor R.P.M.
2) Auto Counter
3) Signal Lamp for Electrical Power "SOURCE ON"
4) Signal Lamp for "LUBRICATION ON"
5) Detector Lamp for "WIRE END OFF".
6) Detector Lamp for "AUTO COUNTER".
7) Detector Lamp for "OVER LOAD".
8) Detector Lamp for "FLYWHEEL COVER OFF".
9) Detector Lamp for "SHORT CUTOFF"
10) Push Button Switch for "LUBRICATION ON"
11) Push Button Switch for "MAIN MOTOR ON"
12) Select Switch for "MAIN MOTOR FORWARD/STOP/REVERSE"
13) Select Switch for "JOG/RUN"
14) Select Switch for "WIRE FEEDING OFF/ON"
15) Control Knob for "VS-Motor R.P.M."
16) Push Button Switch for "ALL STOP"
17) Push Button Switch for "VS ON"
18) Push Button switch for "VS OFF"
19) Select Switch for "SHORT CUTOFF DETECTOR OFF/ON"
20) select Switch for "BRAKE OFF/ON"
21) Push Button Switch for "RESET"
22) Feed Roll control Lever
23) Pressure Gauge for Air Line 24) Pressure Gauge for Lubrication system

6.2.2 Operation Procedure

Operator is requested to check if the wiring is correctly done according to the wiring diagram and if all the fastening bolts and nuts are firmly tightened.

A) Starting Jog operation

1) Check if the Lamp for power source (3) lights up.
2) Check if each select switch is set to the normal position, i.e., (12) for "FORWARD", (13) for "JOG", (14) for "OFF, (19) for "OFF", (20) for "ON".
3) Check if air pressure gauge (23) shows 5 kg/cm^2.
4) Set the required quantity figures of production to the auto-counter (2). (The machine does not run without any figures.)
5) Depress the button for "LUBRICATION ON" (10). When the oil pressure goes up to the required value, the pressure switch actuates and the lamp "LUBRICATION ON" lights up. Check if the oil pressure has reached to 1 - 1.5 kg/cm^2.
6) Depress the button for "MAIN MOTOR ON" (11).
7) Depress the button for "V.S. ON" (17). Jogging operation can be done while the button (17) is depressed. Check the timing of machines, i.e., first transfer, second transfer, second transfer finger open, kickout in die and etc. during the jogging operation.
   Check the loosening of bolts and nuts to prevent the machine from the collision during the operation.

B) Starting No load running operation

8) The no-load running operation can be done by turning the selct switch (13) to the position of "RUN" while the "V.S. ON" button (17) is depressed. The preparation by no-load operation has been finished through the above procedures from (5) to (8).

C) Starting Production running operation

9) Before starting production running operation, open the valve for air-blow on top of the machine frame, to avoid double blow of the blank.

10) Check if the wire is fed correctly to the stock gauge through the shearing die and depressed between feed rolls by feed roll control lever provided on top of the feed box (or in the model AOT-8B or larger by feed control valve lever (22)), and turn the select swtich for "WIRE FEEDING OFF/ON" (14) to "ON".
11) Turn the select switches for all detectors to the position "ON" when they are fixed as an option.

D) Stopping No load running operation

1) Turn the select switch for "BRAKE OFF/ON" (18) to "OFF".
2) Depress the push buttonswitch for "V.S. OFF" (18) and wait slowing down of the machine.
3) Select the switch for "BRAKE OFF/ON" (20) to "ON" when the motor rotation is reduced. Then, the machine will be braked and stopped.

E) Stopping Production running operation

1) Turn all the selct switches for detectors (5) - (9) (option) to "OFF" when they are fixed on the machine.
2) Select the switch for "WIRE FEEDING OFF/ON" (14) to "OFF".
3) Select the switch for "BRAKE OFF/ON" (20) to "OFF".
4) Depress the button switch for "V.S. OFF" (18) and wait slowing down of the machine.
5) Select the switch for "BRAKE OFF/ON"(20) to "ON" when the motor rotation is reduced. Then the machine will be braked and stopped.
6) Close the valve for air blow on top of the machine.
7) Turn the select switch for "MAIN MOTOR FORWARD/STOP/REVERSE" (12) to the position "STOP".

Note;

1) In case of emergency, stop the amchine by depressing the push button for "ALL STOP".
2) In case except emergency stop the machine by the above mentioned operation procedures.

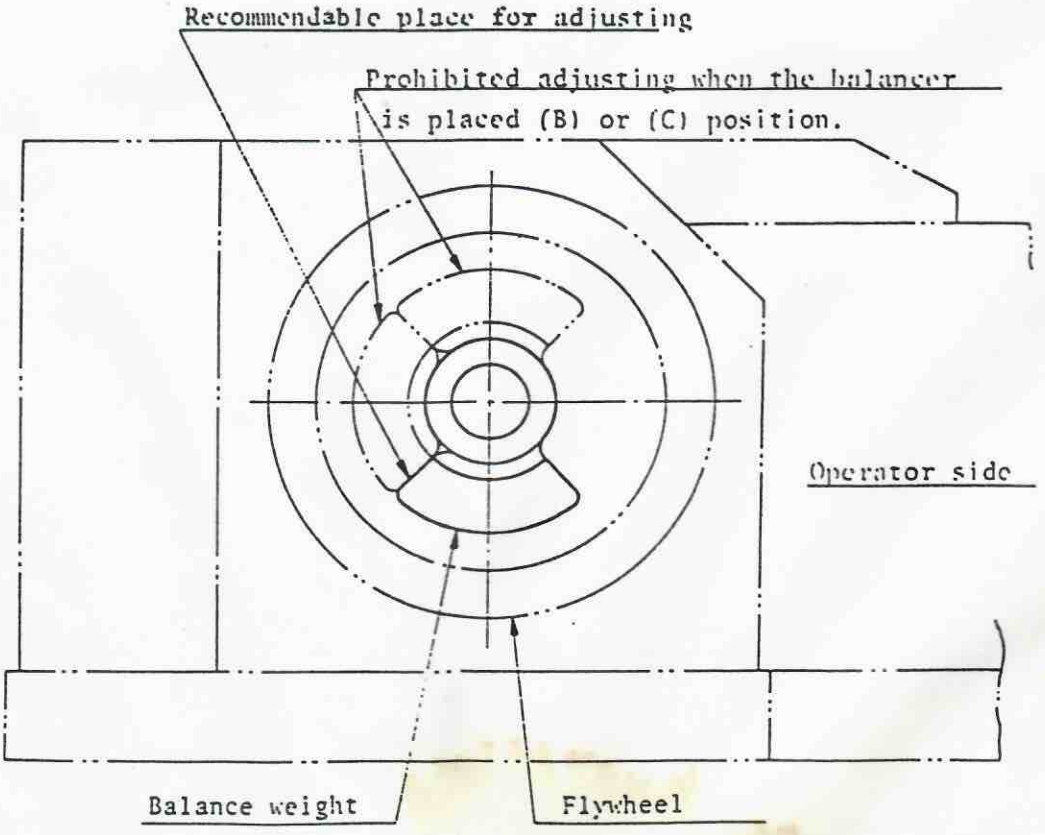
6.3 Cautions for trial operation

The following cautions should be paid during the trial operation.

a) Do not turn the "BRAKE ON/OFF" selector switch to the postion "OOF", when the machine is operated by jogging or adjusted by hand.

b) In this position, the magnetic brake is not actuated, and if the balance weight on the crankshaft is at the unstable position as illustrated in the figure as (B) or (C), the operator is prohibited to adjust the timing manually or to set up the machine by hand. The machine is apt to start to move of itself from (B) and (C) positions with the rotation of the balance to (A).

c) When the required figures are not preset on "AUTO COUNTER" before the operation, the machine does not run. Set the required figures on it in advance of operation.



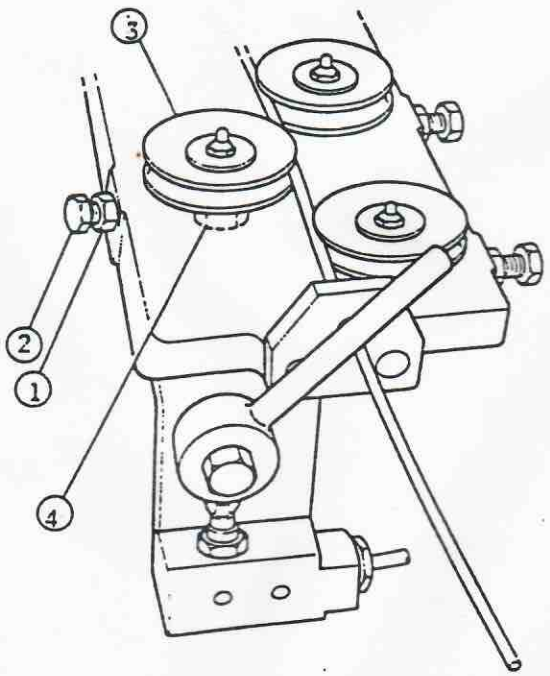
7. WIRE STRAIGHTENER

Pull out and straighen 1 - 2 m of the leading end of the coil on the reel and push wire through the straightener by hand. It is recommendable to remove the coil end of 20 - 30 cm if it is bent or scored and chamfer the end of it with file or similar in advance for easy entry into the cutoff die.

Loosen the lock nuts (1), adjusting bolts (2) and lock nut (4) to keep the feed roll (3) free, and insert the wire to the wire straightener.

Tighten tentatively the adjusting bolts (2) to straighten the bent wire with appropriate pressure. Adjust the straight end of the wire to be in correct alighment to enter between the feed rolls.

Tighten the nuts (1) and lock nuts (4) firmly after the adjustment.



8. WIRE FEED BOX

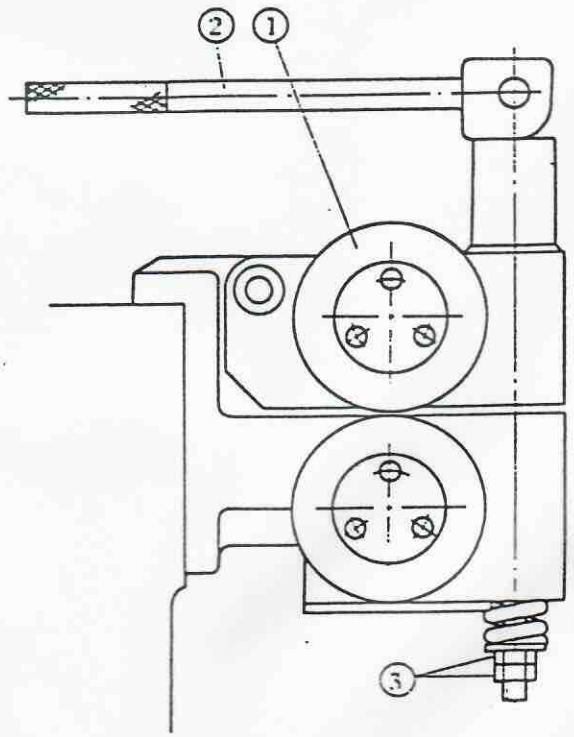
8.1 Model AOT-4B and AOT-6B

Feed-roll-pressure is controlled with the feed roll lever as shown in the below picture.

Mount the feed roll (1) on the feed roll shafts and clamp them with endplates. check the groove of feed roll if there be no damages or scores on them. If no troubles on them, lift up the feed roll control lever (2) to disengage the feed rolls and insert the wire until the end of wire touches the end surface of stop bolt on the stock gauge.

After the adjustment, move the feed roll control lever (2) down to the operating position to apply pressure on the wire and grip it between the feed rolls tightly.

The pressure can be adjusted with double nut (3).



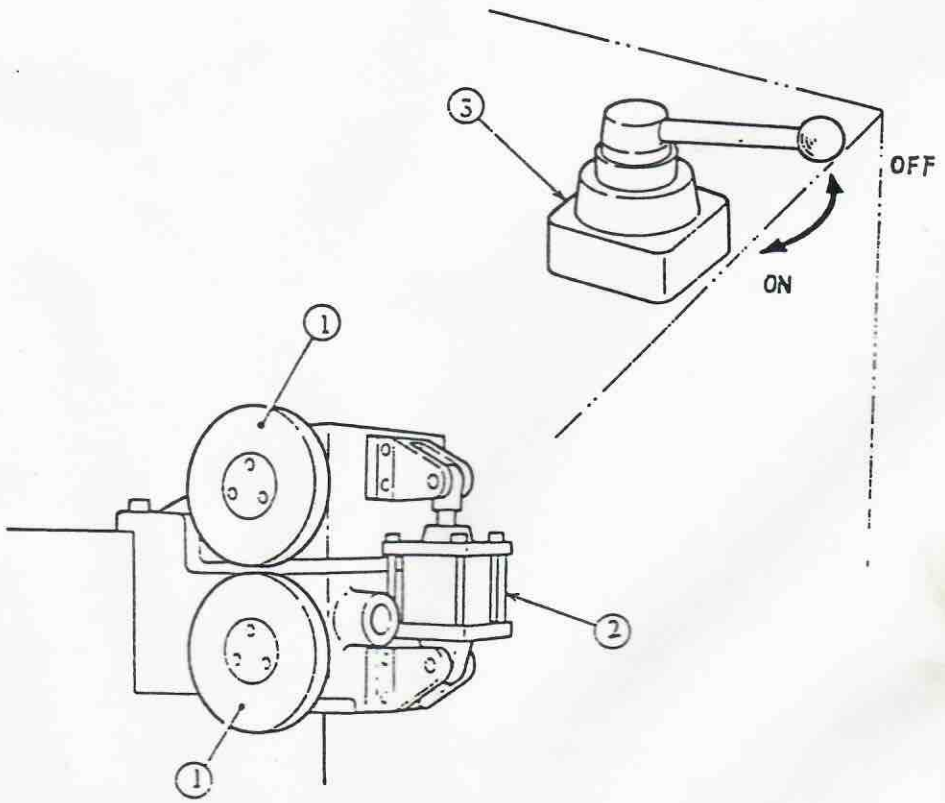
8.2 Model AOT-8B, 10B and 12B

Install the feed rolls (1) on the feed roll shafts and clamp them with end plates after checking if their grooves are correctly finished to suit the wire.

In AOT-8, 10 and 12B machines, air-cylinder system (2) is adopted for pressing the feed roll.

The air pressure should be no less than 5 kg/cm^2. Insufficient air pressure causes short feed of blanks, so that operator is requested to check the air pressure gauge if it does not go down 5 kg/cm^2. But for too soft wires, appropriate pressures should be used.

After checking the above , insert the wire until it come to touch the end of stop bolt on the stock gauge, and turn the lever of control valve (3) to the left or the positon "ON" to grip the wire tightly between the rolls.

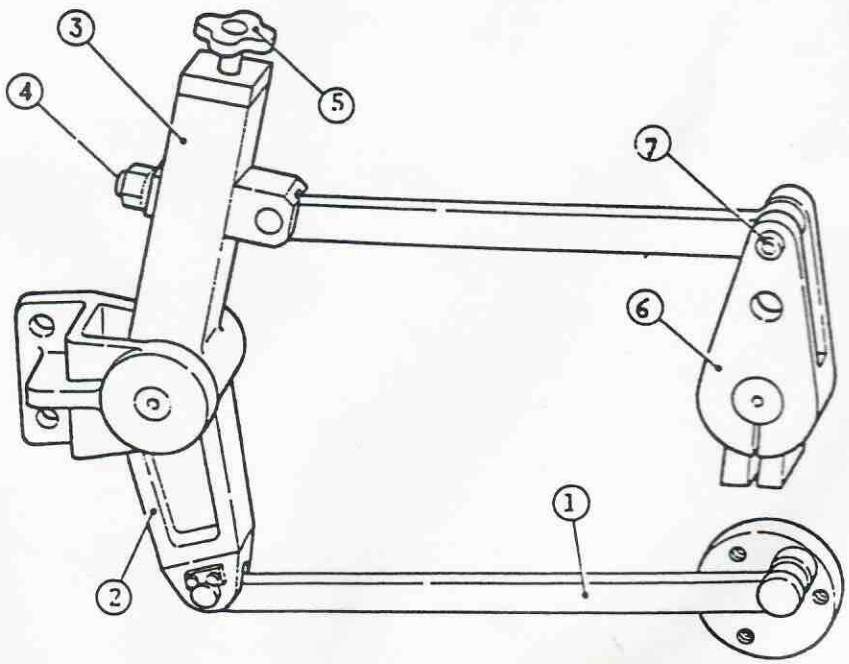


9. WIRE FEED ADJUSTMENT

Wire feeding is done by changing the rotating movement of feed crank disk into the oscillating movement of feed lever (2) through connecting rod (1). In the feed lever (2) is provided with a clutch which is controlled by the select switch "WIRE FEEDING OFF/ON" on the control panel to actuate the feed rolls.

The feed length is adjustable with the adjust knob (5) attached to counter lever (3). After loosening the lock nut (4), turn the knob (5) clockwise and then feed length increases, and vice versa.

Set the pin (7) to the upper position of hole of the lever (6), when particulary small wire feeding is required. After the adjustment, lock the nut firmly.

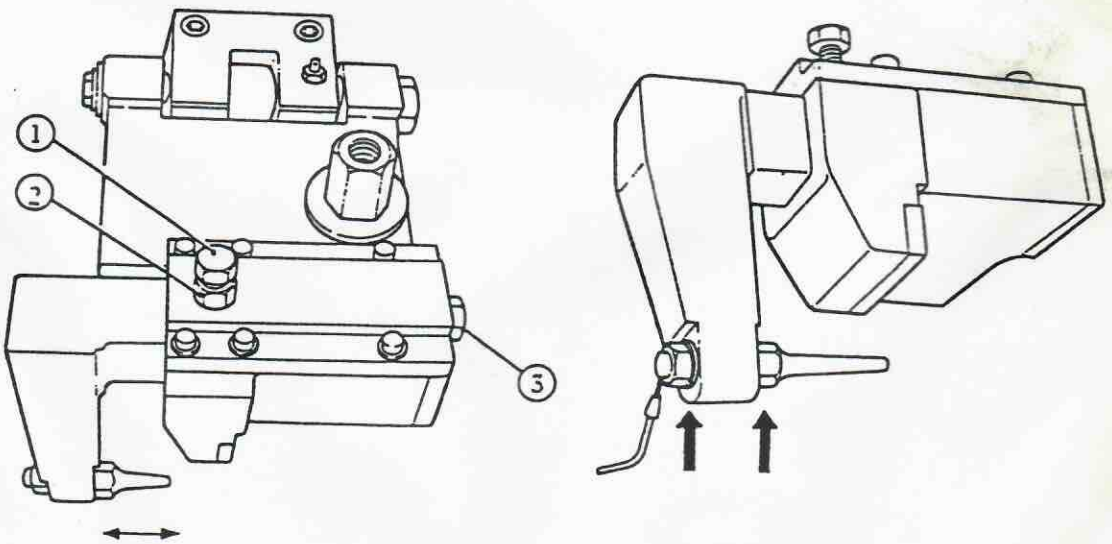


10. STOCK GAUGE

The cut-off length is adjustable with the screw (3) by loosening lock nut (2) and clamp bolt (1). When the adjusting screw (3) is turned clockwise, cut-off length increases and vice versa.

When the short feed detector (Optional) is mounted on the machine, remove the cutting chips or equipvalent from the surface of shaft shown as an arrow in the above sketch to keep free from lack of insulation. When the short feed is detected, the machine will be stopped automatically.

Two kinds of stopper shaft are prepared respectively for long and short blanks. Use one of them according to the requirement. When the adjustment is made, tighten the bolt (1) and nut (2) firmly.



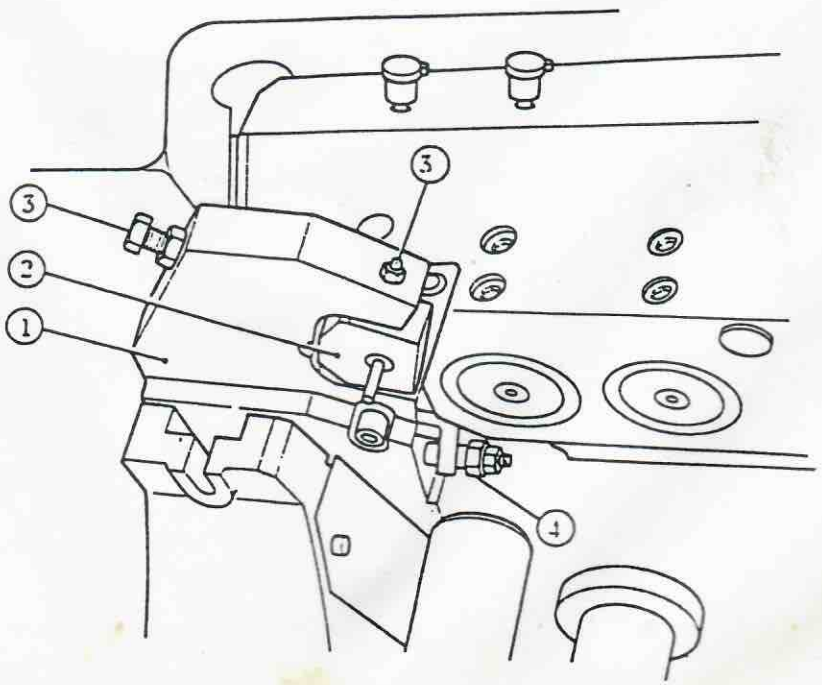
11. CUTOFF DEVICE

Mount the cutter holder (2) on the cutter lever (1). Insert the wire which is cut ot the adequate length as a test piece into the cutter and cut-off quill, and check the alignment of centers between the cutter and quill.

Adjust the position of cutter holder (2) with the above procedures. When the adjustment is made, (then the inserted cut-off blank must move smothly), fasten the horizontal adjusting bolt (3) and the vertical adjusting bolt (4) respectively and lock the cutter holder (2) firmly.

After comfirming again if the inserted cutOff blank moves smoothly, tighten each locking nut for both horizontal adjusting bolt (3) and vertical adjusting bolt (4).

Then cutoff the banks by jogging, and check to see if the surfact of blank is smooth enough without any defects. The operator is not required to make the adjustment of transfer between cutoff quill and pusher die, when the adjsutment of cutter holder is made with the above procedures. The function of positive cam enables to perform accurate positioning of tranfer blanks from cutoff quill to pusher die.



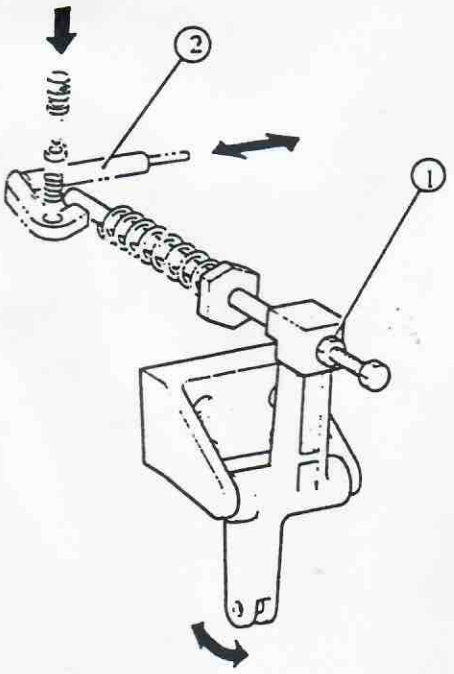
12. PUSHER DEVICE

The machine is designed as follows:

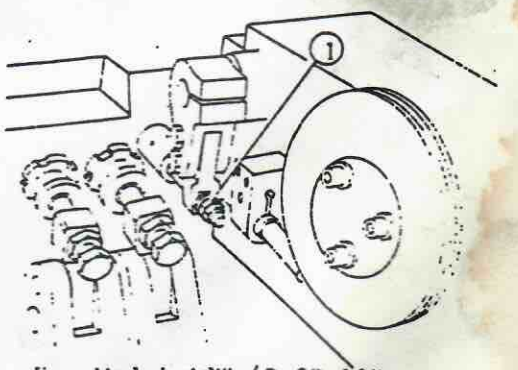
Model	AOT-4B	AOT-6B	AOT-8B	AOT-10B	AOT-12B
Thickness of cutter holder mm	12	18	25	32	38
Stroke of pusher pin mm	15	21	27	35	42

Adjust the pusher pin end position as about 0.5 - 1.0 mm ahead from the surface of cutter with the adjusting nut (1) (the adjusting bolt (1) for model AOT-12B), when the blank is pushed.

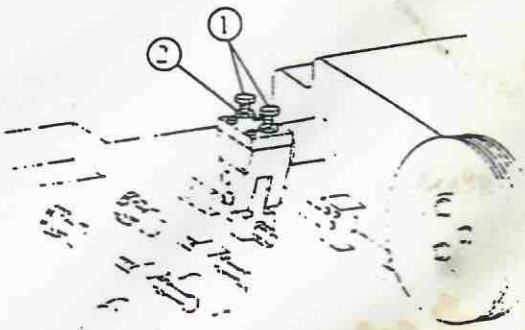
If, in this case, the pusher pin end is set to the position more than 1 mm out of the cutter tip of pin (2) is collided with the cutter when it has returned to its back position. So be careful for push pin end position adjustment. After the adjustment, lock the nut (1) with lock nut firmly.



For Model AOT-4B



For Model AOT-6B, 8B, 10B



For Model AOT-12B

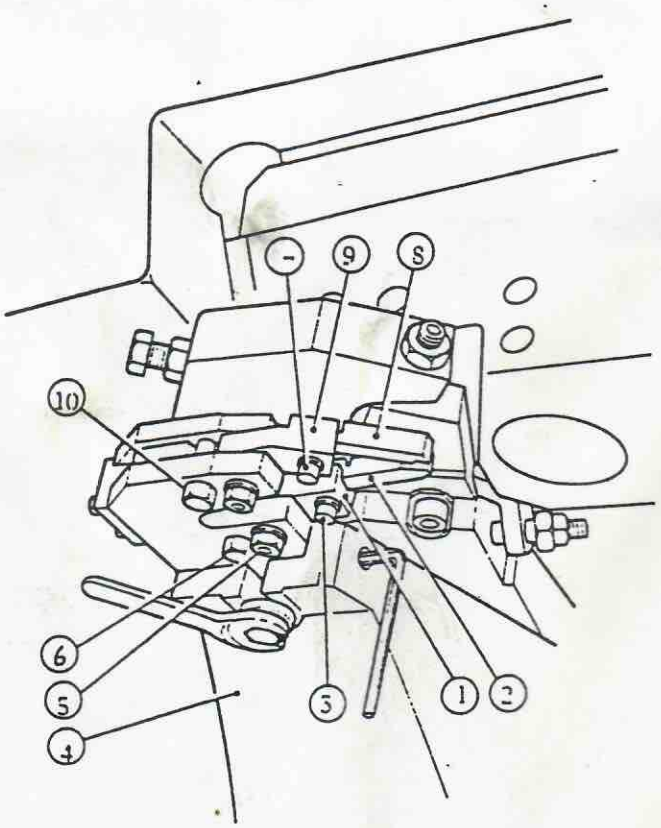
13. FIRST TRANSFER ADJUSTMENT

13.1 Adjustment

Cutoff the wire to the length of about 50 mm and use it as a test piece for adjustment.

Insert the bottom finger (2) into the groove of the finger support (1) and tighten it with the locking bolt (3). Insert the half of the test piece into the first die, as in the below sketch.

Shift the first transfer lever (4) manually to the first die center so as the bottom finger (2) to contact with the test piece. If it does not contact with the test piece, loosen the set bolt (5) and turn the eccentric pin (6) until the finger (2) come to touch with the test piece.

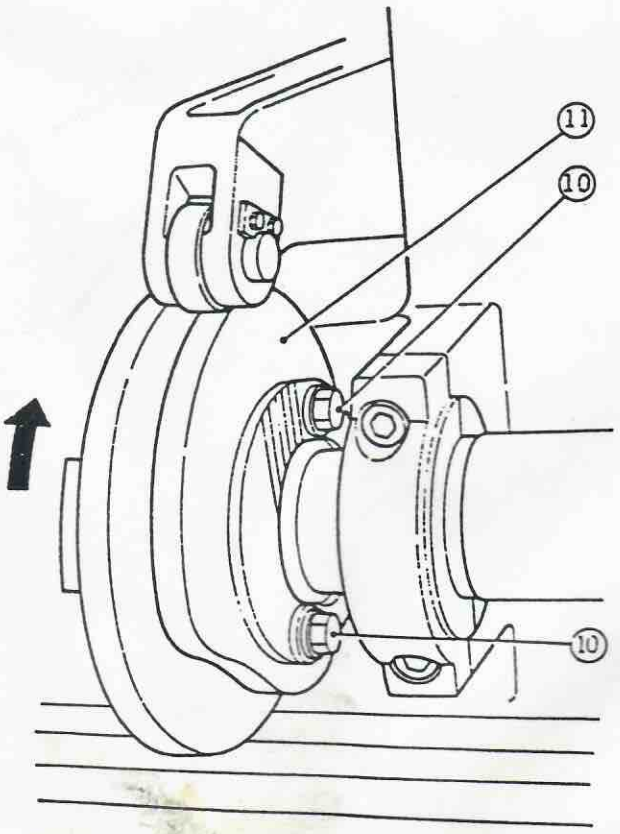


Next, take out the test piece from the first die. Insert the top finger (8) to the groove of the top finger support (7) and tighten it tentatively at the middle of the slit hole.

Place the test piece into the dirst die through the fingers. The end of top finger (8) is grooved to catch the test piece so that the finger is positioned correctly in alignment with the center of die. Fasten the bolt (9) to lock the finger firmly. The fine adjustm ent is made by eccentric pin (10).

The adjustment for the alignment of first transfer has been finished with the above procedures. Retract the transfer lever (4) to the original position and check again by inserting the test piece into the quill through the fingers.

The positive cam is adopted for the transfer mechanism so that the center alignment between the cut-off quill and fingers is ensured when the fingers are positioned in alignment with the center of first die.

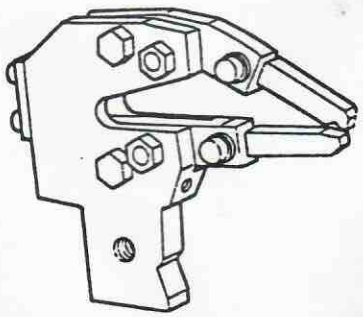


When short blanks are transfered to the die, the transfer timing, the position of the cam (11) is required to be changed. Loosen the timing adjusting bolts (10) and turn the first transfer cam (11) to the direction as in the sketch with the adjusting shaft. The fine adjustment is required for the extremely short products. Operate the machine carefully during the adjustment. After the adjustment, tighten the square washers (12) firmly.

13.2 Cartridge cassette

The parts shown in the below sketch is called as transfer cartridge and complete set of cassette is available. It can be fixed on the transfer lever as the cassette system with tightening bolt M 10 (M16 for model AOT-10B and 12B) and set screw.

It is advisable for the customer to prepare the complete set of cartidge cassette for replacement to save set-up time when finger change is needed.



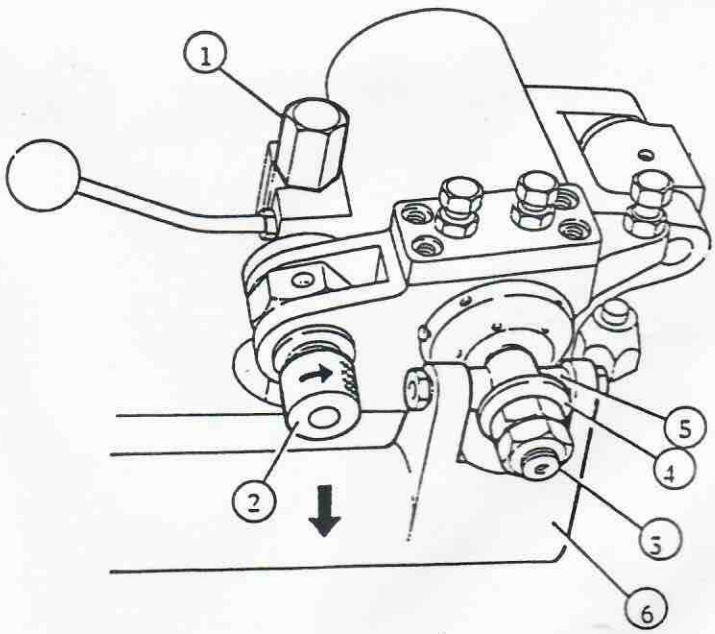
14. SECOND TRANSFER

14.1 Remove of transfer unit

Remove the nut (1). Then turn the joint pin (2) 90 degree as shown with an arrow on the sketch and pull it out from the unit as shown with an arrow. Then, the transfer unit can be lifted clockwise with the lever. Confirm the counter lever (3) to the original finger-close position, when the unit is lifted.

When the unit is lifted under the condition of finger-open, cam - follower (5) is removed from the roller receiver (4) and the rack shaft (6) is pushed forward by means of spring to cause some troubles.

The transfer head become free when the joint pin (2) is pulled out. Supporting the transfer unit with left hand, lift it with right hand by means of the lever.

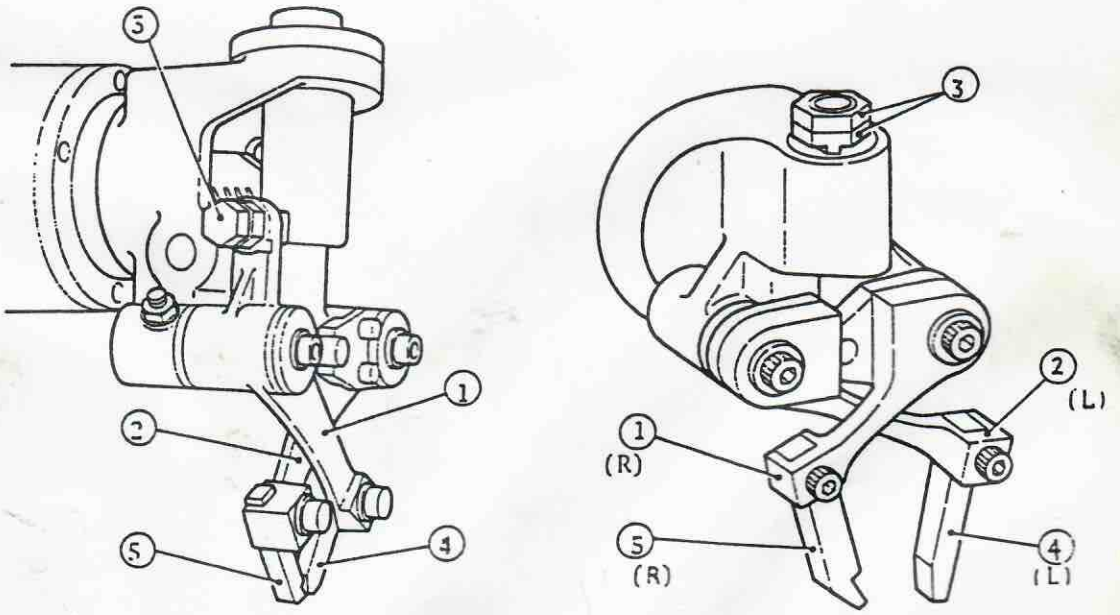


14.2 Assembly of second transfer fingers

The above sketch shows the transfer head view from punch side. Two kinds of finger arms L type (1) and R type (2) are provided, and the finger arm with stopper bolts (3) or the one which is fixed to the left is for L type.

Drive the stopper bolt (3) clockwise so as fingers to have a little room to be finxed easily on the groove of arms.

Two kinds of figers L type (4) (flat surface) and R type (5) (grooved surface) are provided. Be careful also for assembling them on the arms.



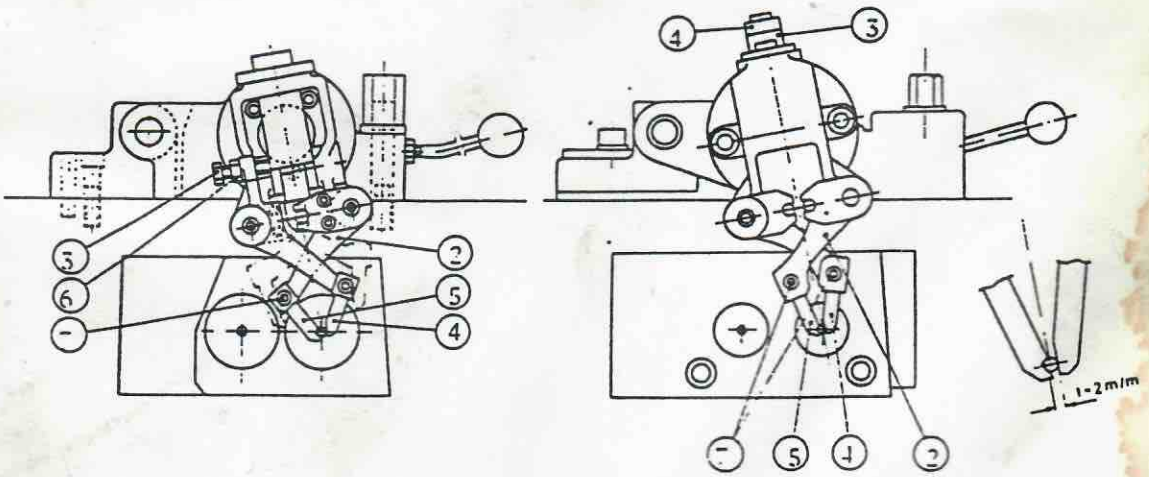
14.3 Alignment of centers between fingers and dies

Use the same test piece as having been used for the adjustment of first transfer and insert about a half of it to the second die.

As in the above sketch, set the finger R (5) on the finger arm R (2) and tighten it tentatively at the middle of slit hole. Swing the second transfer head to the second die by hand.

Turn the stopper bolt (3) counter clockwise to touch the finger with the test piece and lock the nut (6) tentatively.

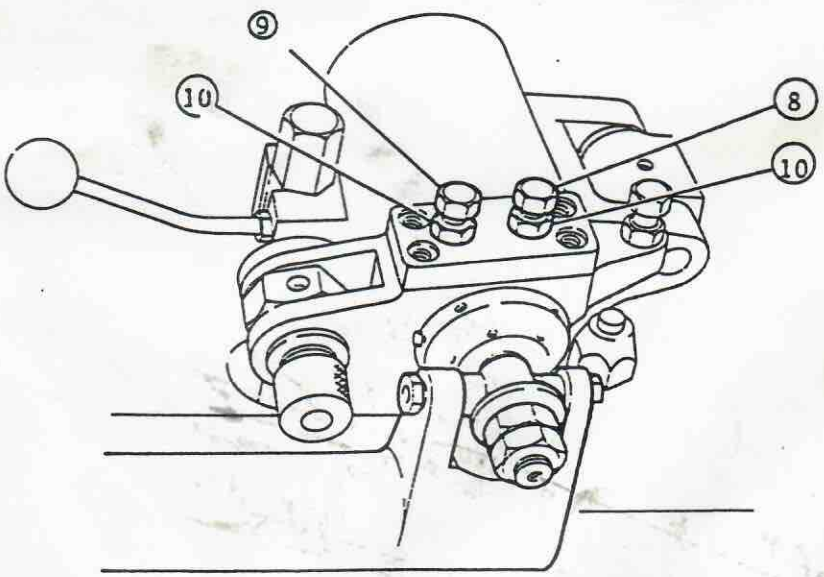
Then, take out the test piece from second die and fix the finger L (4) on the arm same as for finger R.



Insert the test piece into the second die through the fingers. The finger R is grooved so that the alignment of center between die and finger is positioned automatically by means of test piece. Lock the fixed bolts (7) for both fingers firmly when the fingers touch the test piece.

Take out the test piece from the die. Turn the stopper bolt (3) counter clockwise until the distance between the ends of both fingers become 1 - 2 mm and lock the nut (6) firmly.

Run the machine by jogging and check if the test piece is correctly transfered by means of fingers. When the horizontal adjustment is needed use the adjusting screw (8) and (9) as in the below sketch.



When the bolt (8) is turned clockwise, the transfer center moves to the operator's side. When the bolt (9) is turned clockwise, it moves to the opposite side. Do not rotate the both bolts at the same time. Loosen one bolt in advnace of tightening the other clockwise.

When the horizontal adjustment is finished, lock the nuts (10) firmly. The impropo alignment for transfer drive is caused mainly from inadequate adjustment for the bolts(8) and (9) and from improper setting of fingers. When the blanks are not inserted to the die smoothly or if there are any break out of scores on the surface of wire, make the above two adjustments carefully.

The second transfer drive is also controlled by positive cam. When the adjustment of alignment for second die is done, operator is not required to make the adjustment for first die.

14.4 Timing adjustment for transfer drive

The adjustment is made with the drive cam (2) placed on the side shaft (1) as in the below sketch.

The adjustment allowances for timing are as follows. (* Note 1)
In case the shank length is extremely short, loosen the adjusting screw (3) and turn the cam to the direction as in the sketch (*Note 2)

When the adjustment is finished, tighten the lock nut with square washer (4).

Note 1

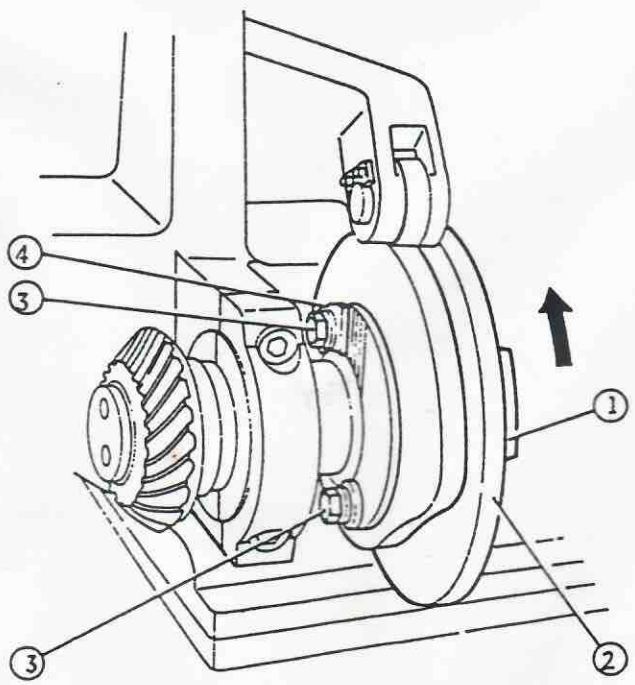
Allowance of angle

AOT-4B	... 2o °
AOT-6B	... 40 °
AOT-8B	... 40 °
AOT-10B	... 30 °
AOT-12B	... 30 °

Note 2

Width across flat of hexagon

AOT-4B	... 17 mm
AOT-6B	... 19 mm
AOT-8B	... 24 mm
AOT-10B	... 30 mm
AOT-12B	... 30 mm



14.5 Adjustment for the amount of finger open

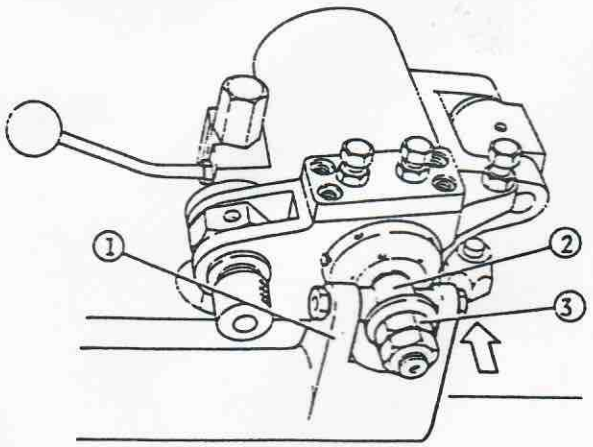
The amount of transfer finger open should be adjusted according to the shape of blanks. As in the below sketch, the oscillating stroke for counter lever (1) is fixed, so that adjustment of the amount is done by changing the position of roller receiver (2) to the direction as in the sketch by loosening the adjusting nut and lock nut (3).

M 12 (*) P=1.75 mm nut is used for AOT-4B for adjustment. One rotation of nut advances the opening amount of about 3 degree. Run the machine carefully by hand and adjust it with full attention.

*Note 1

The sizes of adjusting nut (3) are as follows.

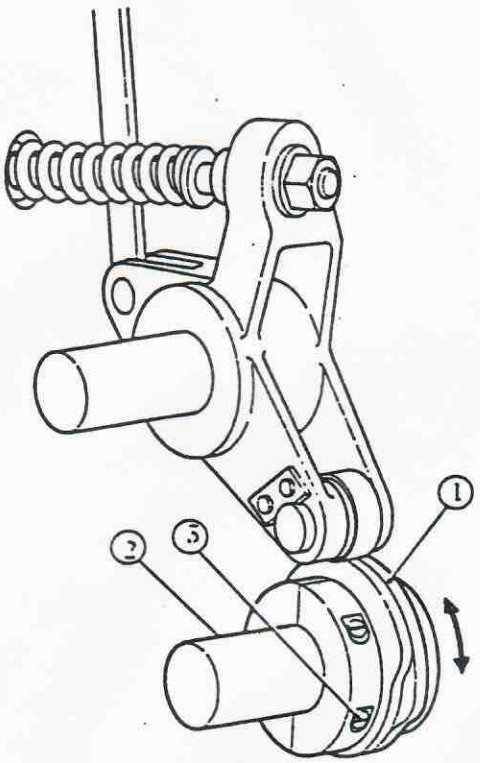
AOT-6B	... M16 (P=2 mm)	AOT-8B	... M20 (P=2.5 mm)
AOT-10B	... M24 (P=3 mm)	AOT-12B	... M24 (P=3.0 mm)



14.6 Timing adjustment for opening and closing fingers

The timing is adjusted by two cams (1) which are mounted on the kickout shaft (2). Loosen the nuts (3) and adjust the cams to get proper position by shifting them mutually.

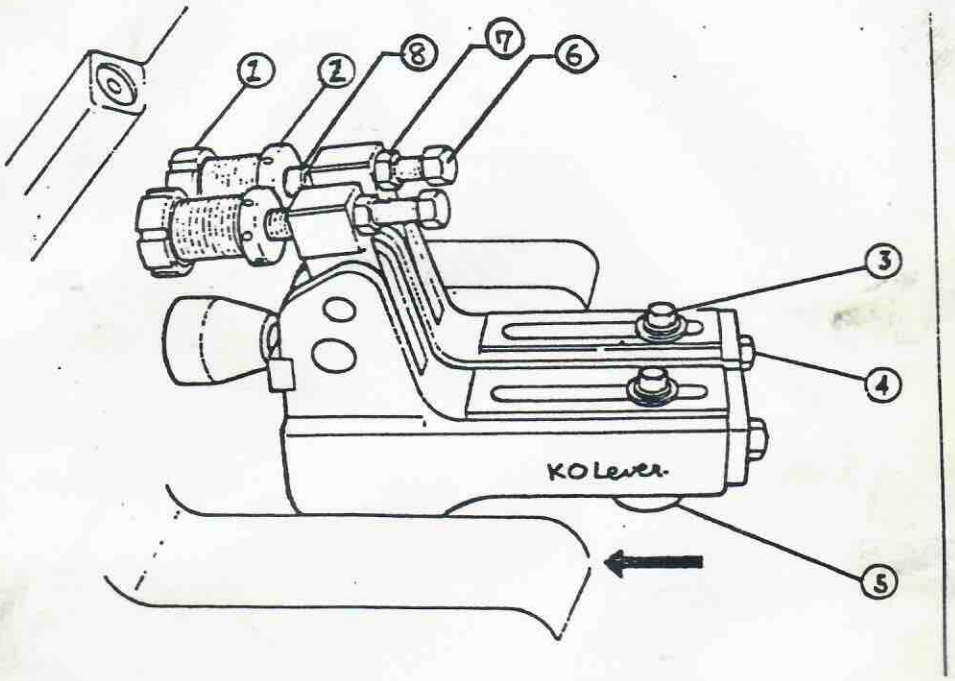
The minimum timing angle for opening is set for AOT-6B to 65 degree and for the other models to 70 degree. When the timing is fixed, tighten the nuts (3) firmly.



15. KICKOUT ADJUSTMENT.

15.1 Adjustment of shank length

The shank length can be adjusted with shank length adjusting screw (2) after loosening the lock nut (1).
After the adjustment, fix the position with the lock nut (1).



15.2 Adjustment of kickout amount.

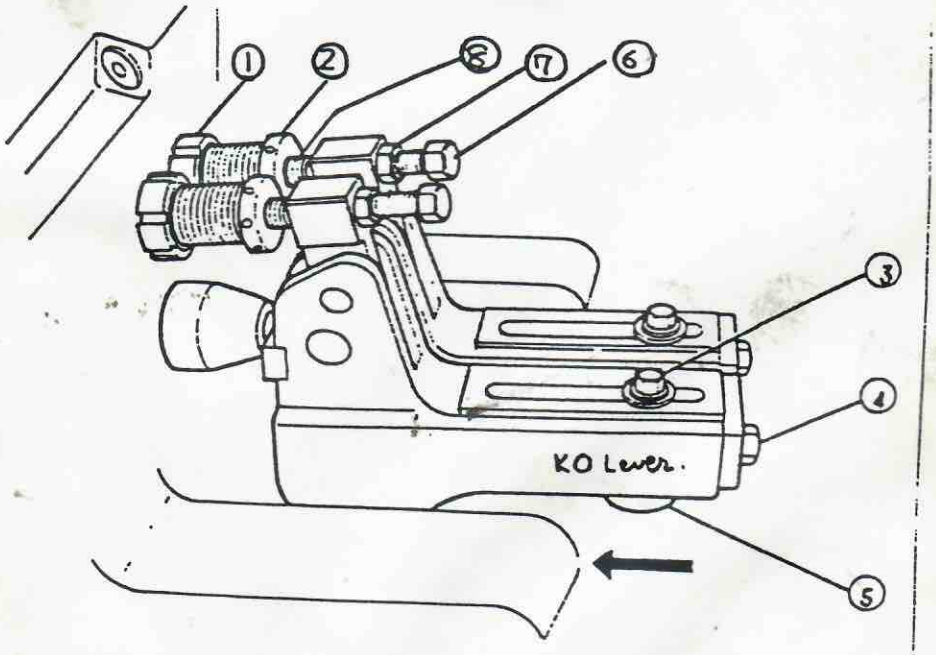
After the adjustment of shank length, perform the adjustment of kickout amount. Loosen the lock nut (7) and adjusting bolt (6), and move the K.O. lever by munual operation to the position after the kickout operation has finished. Be sure to loosen the die clamp bolt during above procedure.

Adjust the adjusting bolt (6) so that the edge of the die pin come to the same face of the dies.. After it, After it, tighten the lock nut (7). By the above necessary adjustment of K.O. amount is completed.

Next, check and adjust the clearance between the K.O. bar (8) and the adjusting bolt (6) to be 0.3 - 0.5 mm by following procedure.

Move the K.O. lever to the position before the kickout operation is not done. Loosen the tonge fixing bolt (3) and turn the adjusting bolt (4) to move the tongue (5) back and forth.

The kickout adjustment has been performed completely with the above procesure. Operator is requested to check again if the space is 0.5 mm between the K.O. bar (8) and the adjusting bolt (6). When the above space is not enough, the forming force is transmitted to kickout bar directly to cause damage.



16. ADJUSTMENT OF PUNCH

16.1 Vertical alignment of punch

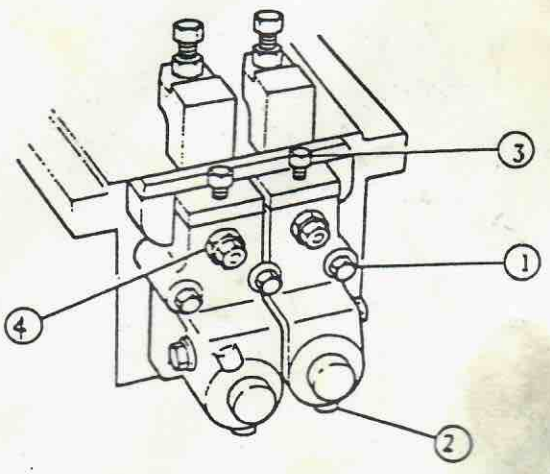
Loosentje fastening bolt (1) and nut (2). Vertical adjustment of punch can be made with the adjusting nut (3). When the nut (3) is turned clockwise, the punch moves downwards and vise versa

Model		AOT-4B	AOT-6B	AOT-8B	AOT-10B	AOT-12B
Width across flat of bolt (1) and nut (2)	mm	17	19	19	24	30
Range of vertical adjustment	mm	±2	±2	±2	±2	±2
Vertical displacement per one turn of nut (3)	mm	1.25	1.25	1.50	1.75	1.75

16.2 Horizontal (right and left)alignment of punch

The alignment of right and left directions can be made with eccentric ring (4). The amount of the eccentricity is 2 mm. A max. eccentric point mark is provided on the ring (4) for easy adjustment. When the ring (4) is turned clockwise punch moves to the right, and vise versa. When it is turned 90 degree, following max. adjustment can be obtained.

AOT-4B .....±1.5mm
AOT-6B .....± 2mm
AOT-8B .....± 2mm
AOT-10B ....± 2mm
AOT-12B ... ± 3mm

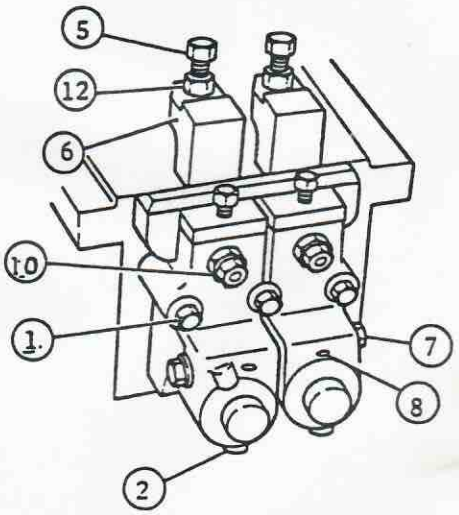


16.3 Back and forth adjustment of punch

Back and forth adjustment of punch can be done by changing the cotter (wedge) (6) position with adjusting bolt (5).

When it is turned clockwise, the punch moves forwards and vise versa. One rotation of bolt gives approximately 0.4 mm movement.

After the adjustment, tighten all fastening bolts (1) and nuts (2), as well as eccentric ring (10) and cotter bolt fastening nut (12) firmly. The fixture of punch is made by bolts (7) and set screws (8).



17. SEIZURE BETWEEN DIE AND PUNCH

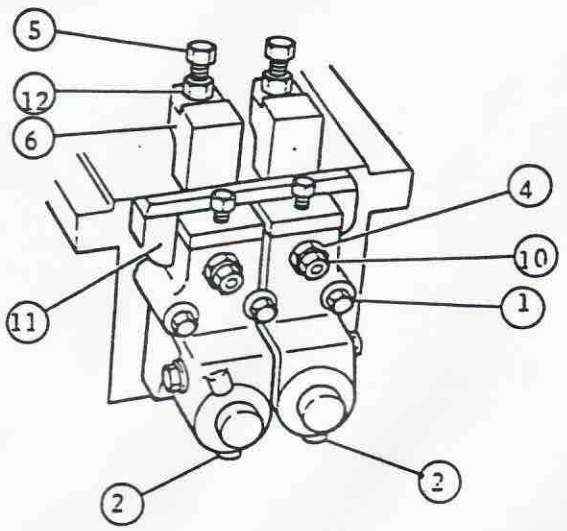
When the machine stop running due to seizure, loosen the lock nut (12) and turn the cotter bolt (5) counter clockwise. Then, blow the head of cotter (6) with hammer and run the machine by hand or jogging. When the seizure is disengaged, return the cotter bolt (5) to the orignal position and lock the nut (12) firmly.

Before loosening the nut (12) note the distance between the head of the cotter bolt (5) and the lock nut (12) and make use of it when to return the cotter to the original position.

18. DISASSEMBLE OF PUNCH HOLDER

The punch holder can be disassembled from the machine by removing the bolt (1) nut (2) guide block (9) lock nut (10) and eccentric ring (4).

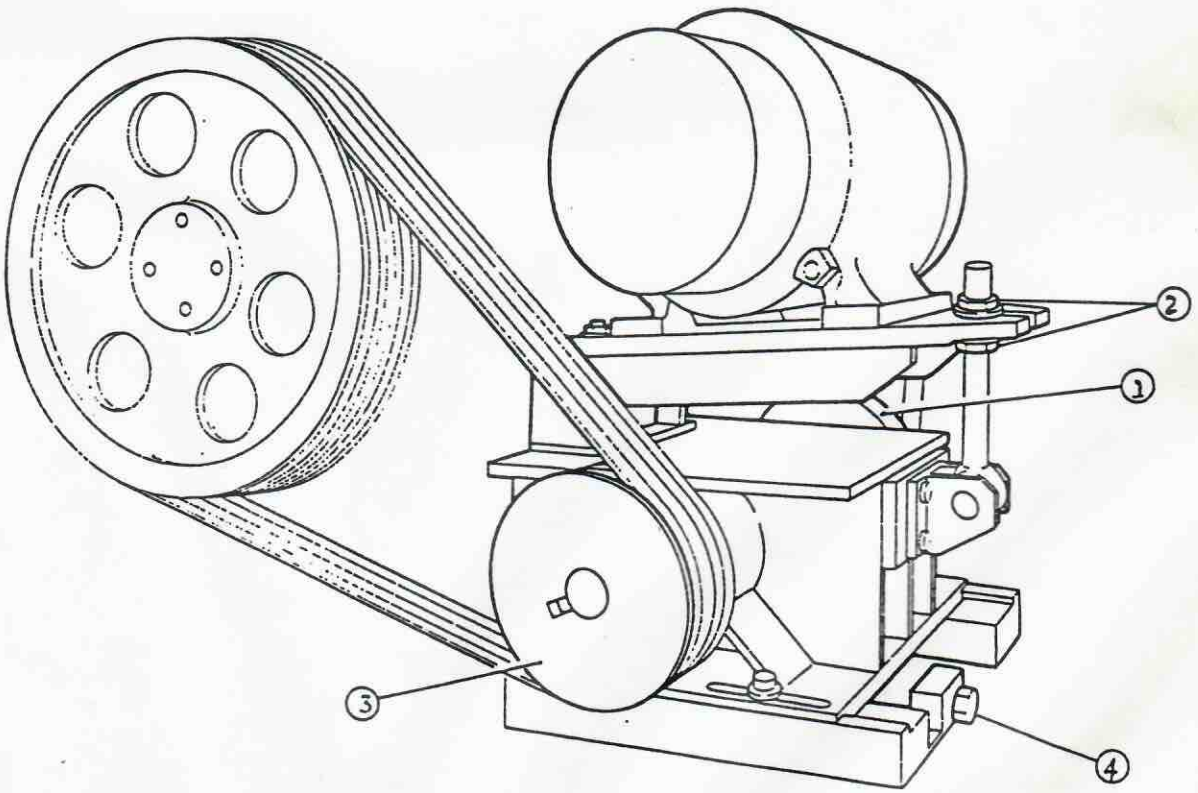
The cotter (6) can be also pulled out after disassembling the ram tie (11).



19. DRIVING SYSTEM

Counter shaft is provided to reduce the output speed of motor. V-belts used are as follows.

Pos.	On the input pulley (1) of the counter shaft		On the output pulley (3) of the counter shaft	
V-belt	Type	pcs.	Type	pcs.
AOT-4B	B	3	B	3
AOT-6B	B	4	C	3
AOT-8B	B	5	C	4
AOT-10B	C	4	C	5
AOT-12B	C	6	D	4
Tension adjustment	By nuts (2)		By adjusting bolt (4)	



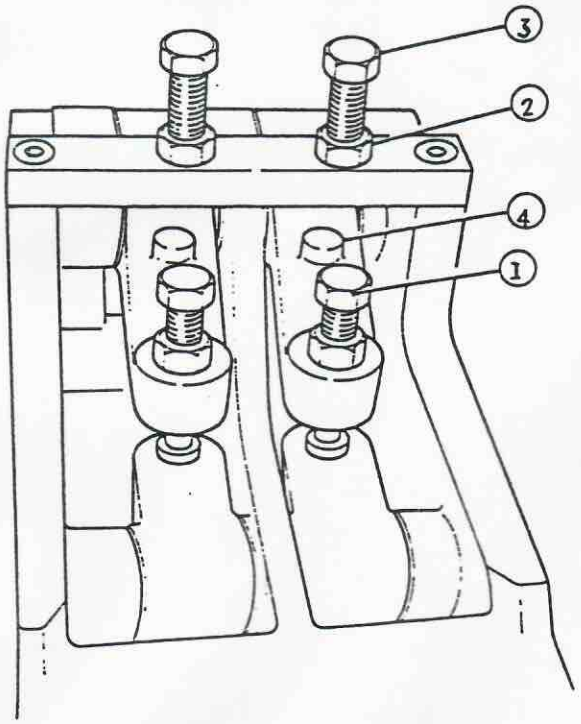
20. PUNCH KCIKOUT ADJUSTMENT (OPTION)

Punch kickout (P.K.O.) adjustment can be done, as in the below picture by adjusting bolt (1) as well as selecting the length of P.K.O. pin. The kickout strokes are as follows (*).

When the P.K.O. movement is not needed loosen the nut (2) and drive the bolt (3) to the position where the roller does not touch with the P.K.O. cam. Run the machine by hand or jogging and confirm if cam lever (4) is not actuated when P.K.O. movement is not needed, and lock nut (2) firmly when the adjustment is completed.

(*) P.K.O. stroke for AOT

AOT-4B	... 8 mm
AOT-6B	...10 mm
AOT-8B	...15 mm
AOT-10B	...20 mm
AOT-12B	...24 mm

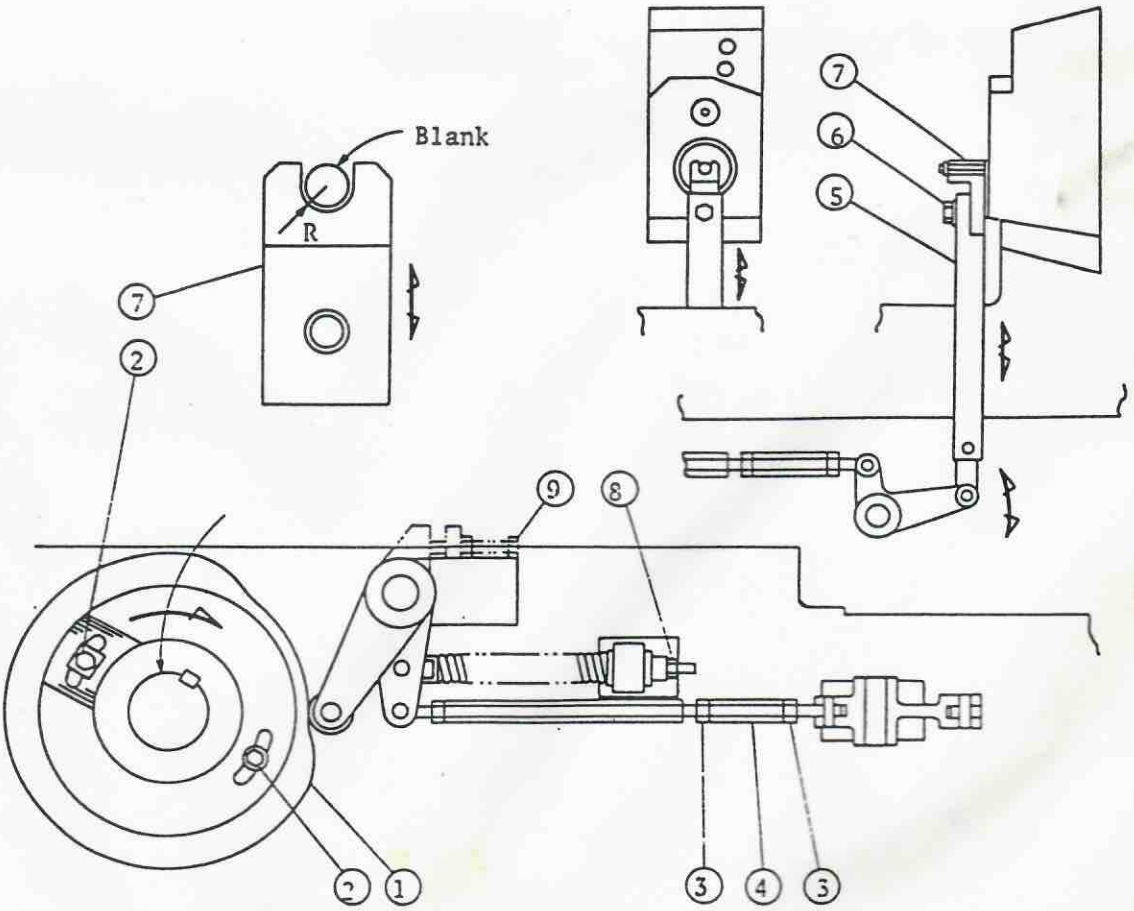


21. STRIPPER (OPTION)

Stripper is designed to be actuated by the stripping cam mounted on crankshaft. Timing adjustment of stripping device is so made after loosening cam clamping bolts (2) and by turning cam (1) clockwise and vise versa, that the slide-bar (5) stops its traversing motion for second die at the same time when the kickout in die has been completed and the kickout lever begins to return.

After timing adjustment, tighten the bolts (2) firmly, and fasten the finger (7) to the slide bar (5) with finger clamp bolt (6) tentatively.

Transfer the finger (7) to the position of second die by inching or hand operation, and check if the center if the center of the radius (R) of the finger (7) aligns with the center of the second die by taking test-piece blank of the same diameter as the work-piece about 50 mm long (about 40 mm long for Model AOT-4B) in and out the second die hole



through the finger (7). When the center of the radus (R) of the finger does not align with the center of the second die hole, loosen lock nuts (3) and align both centers by turning turn-buckle (4).

After completing the alignment, tighten locknuts (3) and finger clamp bolt (6) firmly.

After completing above adjustment, check each motion of the device by inching operation.

When the stripper is not needed, shift the slide bar (5) to its utmost rear position, then apply and drive in nut (8) (hex. bolt (9) for model AOT-8B) until the cam follower disengages cam (1). As for in model AOT-6B and AOT-9B, the finger (7) needs to be removed.

22. COUNTING AND SENSING DEVICES (OPTION)

The following features are optionally available for use with model AOT header:

a. Cycle counter
b. No wire - No feed device
c. Over-current protection
d. Safety door interlock device for manual operation
e. Short cutoff detector

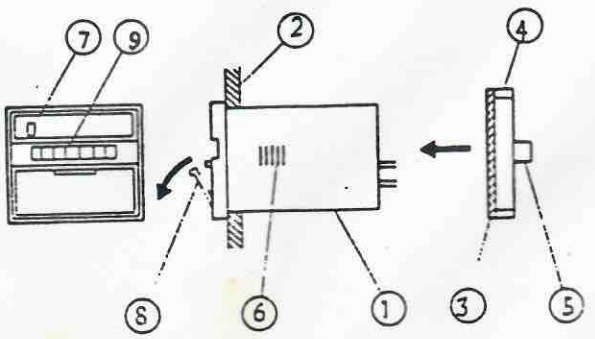
When any abnormality is detected, the red warning light on top of the electric control box begins flashing up, indicating that anu unusual condition is taking place, and at the same time, the electric control circuit opens to stop the machine.

To release the open condition of the control circuit,

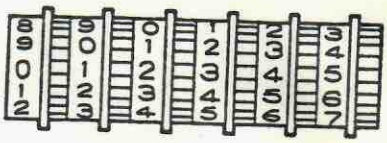
1. Remove all possible causes.
2. Depress the "All Stop" button on the control panel. This extinguishes the flashing red warning light and makes the machine ready for the next operation.
3. Resume the normal operation of the machine.

a) Cycle counter

The machine cycle is stopped when the number of completed cycles has reached the number of cycles or workpieces pre-set on the machine. To re-set the counter, depress "Reset" button (1).



To install the counter (1) in the opening in the control panel (2), attach the rubber mounting fixture (3) with the marking (4) on top, and hook the spring (5) on the groove (6). To remove the counter, move the mounting fixture up, taking the spring off the groove and then pull in back.



A desired number of cycles can be easily pre-set on the counter as follows:

1. While depressing the "Reset" button (7), open the front cover (8).
2. Turn the digital thumbwheel up down until a desired numerical figure on the digit ring appears or on front. Proceed with the setting of the other digital thumbwheels. The illustrated counter (1) is set to five digits "1 2 3 4 5" for example.

The following points calls for special attention in setting the counter.

1. The "Reset" button must be kept depressed while the counter is being set.
2. No attempt should be made to introduce any counting signal pulse from the machine tinto the counter when the counter is being set.
3. The "Reset" button should be pushed by applying finger pressure straight on the button.
4. The operation of the machine should be then resumed after it has been ascertained that all the digits appearing in the window (9) have been zeroed.

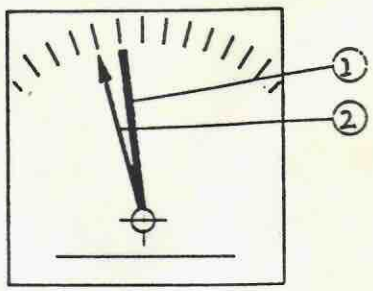
c) Ocerload detector (Over-load protection)

An ammeter unit installed on the control box door incorporates an over-currenct sensor (a red needle) (1). The same unit also has an indicating needle (2) or pointer that deflects on the dial to indicate the magnitude of turrent while the machine is operated for production.

The over-current sensor (1) should be set to approximatly 5 amperes higher than the current value indicated by (2). When the pointer (2) registers the current value of 50 amperes, for example, the setting of the over-current sensor (1) will be 55 amperes.

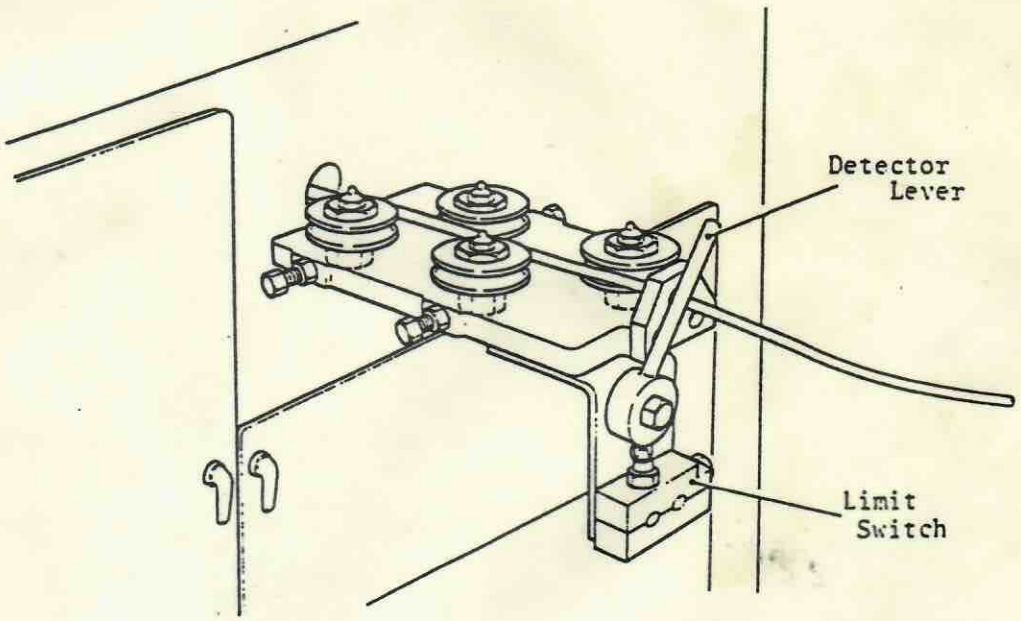
The setting may vary to the type of product, output and so on, and therefore must be determined for each particular application.

If current is in excess of the setting, the device causes and maintains the interruption of current flow to the main drive motor, and as a result, the machine cycle is interrupted.



b) No wire - No feed device

An electric limit switch installed on the wire straightener detects the existence or absence of wire stock being fed into the machine. When no wire is present, or wire stock from the reel-stand has been used up, the detector lever falls down and the switch opens the control circuit to stop the machine. To resume the operation, pass new wire through the wire straightener and lay the lever on the wire and the machine should be then set into operation by following the correct start-up procedure.



d) Safety cover interlock device

To insure safety in manual rotation of the flywheel and position of the heading slide, an access cover on the flywheel is provided with an electric limit switch which cuts off power to the main drive motor when the access cover is open, thus inhibiting the machine from normal production operation.

Be sure to set the "BRAKE ON/OFF" selector switch to "OFF" before making any attempt to operate the machine manually. For the manual adjustment of the flywheel, use a special tool furnished together with the machine.

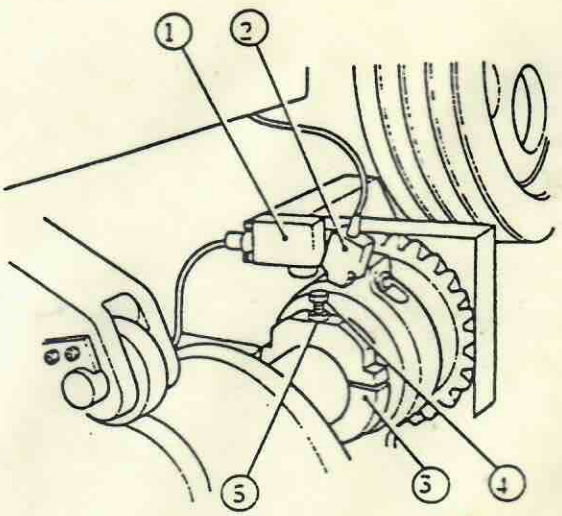
e) Short - feed and auto counter sensors

The two sonsors are placed at the end of side shaft as in the below sketch. One shoed as (1) is for auto counter and the other as (2) is for short-feeding. Bolt (4)* and nut (5) are provided on the split type ring (3) on the side shaft.

The distance between the head of hex. bolt (4) and the sensors has been adjusted to 3 - 6 mm at theplant before delivery. But operator is requested to check the distance before actual operation, as it might be changed during the transportation.

(*) Bolts sizes for AOT series are as follows.

AOT-4B	--- M8x35
AOT-6B	--- M8x40
AOT-8B	--- M8x45
AOT-10B	--- M8x55
AOT-12B	--- M10x50



24. SHORT SPEC PAYOFF SYSTEM

(Electrical Operation Explanation)

Operating Principle

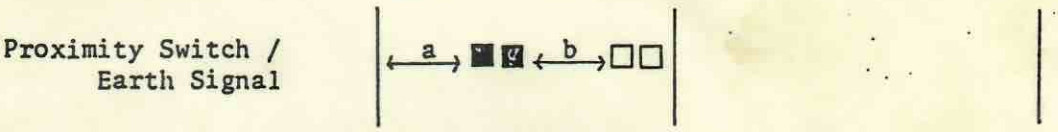
When the proximity switch is activated, its output signal is memorized in the short spec detector unit. Within one revolution of the machine (before the proximiniy switch can be activated again) the stopper is brought into contact with the wire, the detector unit is notified of this contact, and the initial signal from the proximity switch is cleared from memory.

In cases where the stopper is not brought into contact with the wire within one machine revolution, the signal from the proximity switch in the detector unit's memory is not cleared. If another signal is activated from the proximity switch during this condition, the machine will be mechanically shut down.

Operating Conditions

1. Lubrication ON (lubrication lamp is lit)
2. Wire feed is ON
3. Short spec select switch is ON

Timing Adjustments



Reel Dead Center Front Dead Center

Proximity Switch Signal: □□ Angle: a=45 degrees

Earth Signal : ■■ b=30-90 degrees

As the (b) angle becomes smaller, machine shut down speed increases in relation to the time of output of the short spec signal. As an indexable reference, it is desirable to set the proximity switch activation point when the pusher begins to open.

Initial Reset

To provent inacurate operation of the short spec detector unit, do not activate the function within one second after power ON and setting of the selector switch.

Machine Shutdown from Short Spec Detection

When an abnormal signal is input into the detector unit, wire feed is stopped and the machine is shut down. At the same time the short spec lamp is turned on along with the blinking machine warning lamp.

SECTION 11 GENERAL MAINTENANCE HINTS

Too much emphasis cannot be placed on the importance of keeping the machine at its best. Before starting on production operation, the following points should be attended with reference to directions given in the foregoing sections of this booklet:

(1) DAILY INSPECTION AND MAINTENANCE

(a) Check the lubricating oil tank for oil level.

(b) Charge all oil cups.

(c) Check the inside of the machine for possible exsistence of foreign matter, or any part not belonging naturally in the place where found.

(d) Check for looseness of the fastening for the working parts.

(e) Check the tooling for wear and damage.

(2) SERVICING MADE REGULLARLY OR AS REQUIRED

(a) Charge all greasing fittings.

(b) Clean the suction filter.

(c) Clean the return-line filter.

(d) Clean the oil tank.

(e) Drain the air filter.

(f) Fill the lubricator.

(g) Clean and oil the feed cam clutch.