SRPF-20 / SRPF-45

SEMI-AUTOMATIC SPRING ROLL & SAMOSA PRODUCTION LINE

OPERATION MANUAL

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Symbols


Warning or Caution

[ ] Number in brackets refer to specific part number

1 INTRODUCTION

The SRPF-20/SRPF-45 Semi-Automatic Spring Roll & Samosa Production Line is designed to produce a continuous sheet of thin baked batter skin that can then be cut. Both length and width of pastry sheet can be adjusted to desired specifications. A stuffing depositor then places stuffing onto pastry sheet as it moves along a conveyor belt system. Workers on both sides of conveyor belt can then wrap and roll these into spring rolls.

Food products the SRPF-20/SRPF-45 can make include spring rolls, samosa, and other types of foods that require thin skin wrappers. Various stuffings can be used such as beef, pork, seafood, and vegetable. The SRPF series machines are perfect for use in production line style food processing.

2 SPECIFICATION & FUNCTION

	SRPF-20	**SRPF-45**
Capacity per Hour	216 m of pastry sheet/hr Deposit 1,200 pcs/hr max.	486 m of pastry sheet/hr Deposit 2,400 pcs/hr max.
Baking Drum	600 mm diameter	1200 mm diameter
Pastry Width	220 mm max.(special sizes can be accommodated)	
Pastry thickness	0.4-0.7 mm	
Electrical Power	220/380/415VAC, 50/60HZ, 3-phase Note: custom power supplies are also available.	
	18 kW	36 kW
Dimensions Baking Machine Stuffing Depositor Conveyor Belt	 1080(L)x1020(W)x1650(H) mm 850(L)x600(W)x2000(H) mm 4100(L)x820(W)x1000(H) mm	 1800(L)x1200(W)x1820(H) mm 850(L)x600(W)x2000(H)mm 5100(L)x820(W)x1000(H) mm

(Descriptions & Specifications are subject to change without notice)

Machine parts in contact with food materials are constructed from food-standard stainless steel. Machine parts in contact with dough material are coated with Teflon, making it easy to clean.

3 STRUCTURE & PRINCIPLE

The SRPF-25/SRPF-45 consists of the following systems:

1. Batter Pump
2. Spray Nozzle
3. Baking Drum
4. Water Cooler
5. Rotary Cutter
6. Conveyor Belt
7. Stuffing Depositor

3.1 Batter Pump

Batter from batter tank is delivered to the spray nozzle by the rotating action of the batter pump gears. A variable speed motor controls the amount of batter delivered to spray nozzle (Figure 3 & Figure 4).

3.2 Spray Nozzle

Located beneath the baking drum, the spray nozzle wipes a thin layer of batter onto baking drum with batter delivered from batter pump. A water cooling system (see below) prevents the spray nozzle from overheating and keeps batter from becoming pre-baked. Roller bearings set the distance between spray nozzle and baking drum to allow adjustment of pastry skin thickness. (Figure 5 & Figure 6).

3.3 Baking Drum

Baking drum cooks the layer of batter spread by spray nozzle. Heating plates are installed inside the baking drum to generate the heat needed to bake the batter. Temperature control panel, SSR micro processor temperature controller and sensor regulates the drum surface temperature. Depending on pastry sheet thickness, typical baking temperature is around 150 degree Celsius.(Figure 6 & Figure 8).

3.4 Water Cooler

Water is supplied to spray nozzle to keep batter at nozzle outlet from heating up from radiative heat of baking drum. A 60 W pump circulates the water. The water cooler with a 1/2 HP compressor cools down the warm water returning from baking drum.

Water will evaporate over time, so please check water level and add more when necessary.

3.5 Rotary Cutter

The rotary cutter cuts pastry sheets to designated size after baked pastry sheet is separated from baking drum. The size of rotary cutter can be adjusted to obtain the desired sheet size.

3.6 Stuffing Depositor

The patented stuffing depositor places a fixed amount of stuffing onto the pastry sheet as it passes by along the conveyor belt. The speed is internally controlled to coordinate between the rotary cutter and stuffing placement. Different stuffing mold pieces can accommodate different shapes and amounts of stuffing.

The stuffing depositor uses pneumatic pistons to actuate the depositing action and requires a 1HP or larger air compressor.

Please refer to Figure 17, Figure 18, Figure 20.

3.7 Conveyor Belt

The conveyor is connected to the rotary cutter to provide a production line. After the rotary cutter cuts pastry sheets to size and stuffing has been deposited, workers along the conveyor can wrap and roll the product into its final shape.

4 MAINTENANCE

To maintain smooth machine operation, all gears must be inspected and lubricated with grease every six months. Any exposed cogwheels, drive gears, chains and cams need to be lubricated with grease every three months. All external transmission portions should be lubricated with solid grease lubricant. Any exposed accessories of machine can use edible lubricants instead of grease. Edible lubricating grease can also be used for lubrication, but do not use salad oil.

If heating plates are worn out, please replace. Heating plates are connected in a 3-phase Y-configuration. A total of three sets of plates are connected inside the baking drum and each set differs with model number as follows:

1 SRP-20 Each set has 8 heating plates connected in parallel.

2 SRP-45 Each set has 16 heating plates connected in parallel.

5 ELECTRICAL SYSTEM

The electrical system consists of the main control panel, and electrical cabinet. The chassis is internally connected to the ground wire. The SRPF series machine does not come factory-wired as different models require different amounts of electrical power. Therefore, the end user is responsible for connecting the electrical power.

Three-phase electrical power is required for this machine. The power cable contains four wires: three high voltage wires and one ground wire. The ground wire is either green or yellow-green color.

Turn off main power and disconnect from electrical socket before performing any electrical adjustment.

If baking drum does not rotate in clockwise direction, 3-phase power is connected in the incorrect order. Please interchange any two high voltage electrical wire connections to correct.

For safety, always make sure to properly ground the machine.

5.1 Main Control Panel

See Figure 9: Control Panel of SRPF-20 & Figure 10: Control Panel of SRPF-45.

5.2 Rotary Cutter Control

A safety shutoff switch is located on the acrylic plate in front of the rotary cutter. If the acrylic plate is lifted, exposing the rotary cutter blade, the whole system will stop immediately. Please immediately start the cooling water switch and remove spray nozzle from baking drum. If not removed, spray nozzle will be deformed by high temperature, or batter will congeal at the spray nozzle outlet.

5.3 Stuffing Depositor Control

The stuffing depositor triggers whenever it receives a signal from the rotary cutter. After waiting a fixed amount of time, the depositor puts a piece of stuffing onto conveyor belt. The timer is located inside the depositor's electrical cabinet and needs to be adjusted to set the waiting time between receiving the rotary cutter signal to the depositing action.

A power-on and power-off buttons are located on stuffing depositor to turn on and off system. The stuffing propeller motor is controlled by an inverter allowing continuous variable speed adjustment.

6 ASSEMBLY, ADJUSTMENT AND OPERATION

6.1 Installation

When installing machine, please make sure to connect electrical power and ground. There are four wires: three phase wires and one ground wire. The ground wire is indicated with the green or green-yellow wire.

If baking drum does not rotate in clockwise direction, 3-phase power is connected in the incorrect order. Please interchange any two high voltage electrical wire connections to correct.

Place machine in a horizontal location. Two adjusting legs in front of machine may help to stabilize machine.

6.2 Preparation

Parts in contact with food should be cleaned and smeared with edible oil before assembly.

Use tools in toolbox for assembly and adjustment.

A General preparation

Disassemble, clean, and reassemble the gear pump (Figure 3) and the spray nozzle (Figure 5 & Figure 6).

Fill water tank (Figure 7) with water up to HIGH water line.

B Stuffing Depositor

See (Figure 17) and (Figure 18) for part references.

a-1 Action of deposit mold

- (1)Upper push plate(05) to push the stuffing by air cylinder action, the long main drive stick transmits the into the rectangular hole of deposit mold plate.
- (2)By air cylinder action, the short main drive stick transmits the deposit mold plate to push the stuffing out.
- (3)The deposit press plate presses the stuffing in the rectangular hole of deposit mold plate onto the pastry sheet.

b-1 Caution

- (1)Deposit press plate[04] should be aligned over the rectangular hole of the deposit mold plate[03].
- (2)If alignment is necessary, loosen adjustment nuts[11] and turn rod[10] until deposit press plate[04] is aligned with the deposit mold plate[03]. Tighten adjustment nuts[11].
- (3)The twin axes air cylinders should work in synch or else the stuffing deposit action will not be smooth.
- (4)The up and down motion of the pneumatic cylinders can be adjusted with speed control valves on each cylinder. These valves are air release type. Cylinder will slow down if adjustment screw is tightened and will move faster if adjustment screw is loosened.
- (5)If upward stroke is not smooth, adjust upper valves.
- (6)If downward pressing action is not smooth, adjust lower valves.

6.3 Operational Steps

A Cooking Pastry Sheet

Turn on heater, baking drum, water cooling system, and conveyor. Do not turn on gear pump, rotary cutter, or stuffing depositor (Figure 9).

Fill batter tank with batter. Batter should be thoroughly mixed without any lumps.

Turn on gear pump once the surface temperature of drum reaches the set temperature (typically around 150-degree Celsius). Also make sure the temperature of cooling water is down to around 5-degree Celsius.

Rotate clutch lever to the right to bring spray nozzle up to the baking drum.

When batter begins to contact the baking drum, adjust the gear pump until both edges of spring roll sheet are flush.

Adjust baking drum rollers to get the desired pastry sheet thickness. For minimum thickness, rotate knurled knob to the right side, for maximum thickness, rotate knurled knob to left side.

Adjust surface temperature of baking drum according to individual experience.

Adjust sheet scraper to contact the surface of the baking drum. Once the pastry sheet is well baked, it will be easily scraped off the baking drum surface by the scraper.

B Cutting & Stuffing Deposit

Turn on switch of rotary cutter

Adjust rotary cutter speed until pastry sheet reaches desired length.

Load stuffing into stuffing hopper and start stuffing propeller.

Adjust rotation speed by changing the inverter frequency.

Connect air compressor to pneumatic pressure regulator (Figure 20) to start depositing stuffing.

Adjust timer located inside electrical cabinet of stuffing depositor if incorrect wait time between cutting of pastry sheet and depositing of stuffing.

C Wrap and Roll into Final Product

Pastry sheets with stuffing will travel down conveyor belt.

Workers on either side of conveyor belt can then wrap and roll to produce final product.

D Power Down

Turn off all power switches except baking drum rotation.

Remove mounting nut and hose joint of spray nozzle.

Turn on gear pump to empty remaining batter. Turn off gear pump.

Once baking drum temperature has decreased, turn off baking drum rotation.

Disassemble and clean gear pump and gears, silicone tubing, spray nozzle, etc. and then reassemble.

Wipe baking drum with dry cloth once baking drum is air-cooled.

6.4 Adjustment of Pastry Sheets

A Size of Pastry Sheet

A variable-speed motor controls the length of the pastry sheet. By increasing the rotation speed of the cutter, the pastry sheet length will decrease proportionally.

The pastry sheet width is controlled by the width of the spray nozzle used. Change spray nozzles to alter pastry sheet widths.

B Rotary Cutter Pressure

The pastry cutting function uses a rotary cutter and SUS304 (stainless steel) roller drum. By adjust the cutting pressure properly between rotary cutter and roller drum, the pastry sheet can be well cut.

Do not adjust the pressure too high or cutting motion will not be smooth and will shorten life of rotary cutter.

To adjust rotary cutter (see Figure 13):

1 Loosen Screw #1.

2 Adjust Screw #2 until desired cutting pressure.

3 Re-tighten Screw #1.

6.5 *Adjustment of Stuffing Depositor*

A Stuffing Quantity

Refer to (Figure 17) and (Figure 18) for part references.

Similar shape and weight

If stuffing weight varies by a small amount and shape is similar, simply adjust the speed of stuffing propeller. The faster the propeller speed, the more stuffing that is forced into deposit mold plate[03] resulting in higher density and more weight. Decreasing propeller speed will yield opposite results. It may be necessary to adjust the air cylinder pressure to compensate for the change in stuffing weight.

Different shape and weight

If stuffing weight and shape varies considerably, the deposit mold plate[03] must be changed. Simply loosen the knurled nut[09], switch mold plates, and re-tighten nut. Whenever the deposit press plate[04] is changed, remember to first remove air pressure tube[J] and knurled nut[09].

B Air Pressure

Refer to Figure 20: Stuffing Depositor Air Pressure Regulator.

The proper air pressure should be adjusted to 4-6 kg/cm. Pressure outside this range will make depositing action jerky.

To increase air pressure, turn pressure-adjusting knob clockwise. To decrease air pressure, turn knob counter-clockwise.

Add lubricant to oil inlet when lubricant indicator shows insufficient lubricant.

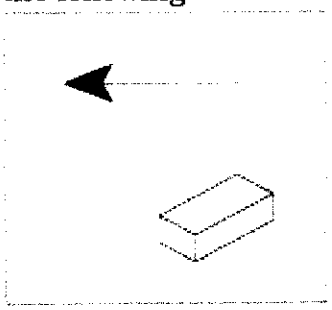
Adjust oil drip speed with oil adjuster. The "R" direction will increase drip speed while the "L" direction will decrease drip speed. In general, every 50 deposit cycles requires a drop of lubricant.

C Stuffing Deposit Timing

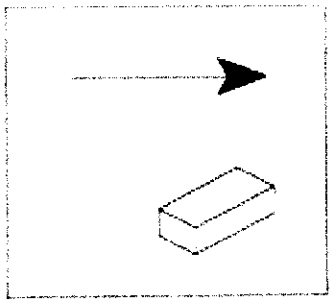
When adjusting timers. The total period of all timers combined should not exceed the period of pastry sheet output. If this occurs, stuffing will be deposited on the wrong location.

Timer O

When facing the baking drum and control panels, the timer adjusts the following:



Turn timer knob RIGHT to move stuffing deposit to left side.



Turn timer knob LEFT to move stuffing deposit to right side.

Timer P

After timing of timer [O] finishes, timer [P] moves upper push plate[05] and delays action of deposit mold plate[03] until end of timer [P] cycle.

Timer Q

This timer controls the time the Deposit Press Plate is pressed. When timer finishes, Stuffing depositor is ready for next deposit cycle.

7 BATTER

Sample batter recipe

Ingredient	Amount
Wheat flour	10 kg
Water	10 kg
Salt	0.1 kg

Mix 7.5 kg water and 0.1 kg salt in mixer until salt dissolves.

Add 10 kg wheat flour and mix at low speed for 2 minutes.

Shift to high speed (over 120 RPM) and mix for 40 minutes. (Gluten comes out in 5 minutes → Gluten decomposes in 15 minutes → Batter emulsifies completely.)

Shift to low speed and add remaining 2.5 kg water and mix for 10 minutes.

Let well-mixed batter stand for over 20 minutes before use.

8 OPERATING PRECAUTIONS

A. Before connecting power, verify proper voltage, frequency, and phase.

B. Do not allow systems to move in the reverse direction.

C. Before operation, make sure all parts are properly assembled into machine, or damage to machine can occur.

D. During operation, re-supply machine with batter and stuffing from time to time to avoid production loss.

E. Cover batter tank when machine is not in use to prevent something from dropping into machine and causing damage. Or reassemble machine before each use.

F. Please connect the machine to ground to prevent damage to inverter.

G. If the voltage levels are not stable, please install voltage stabilizer to extend the life of machine.

H. After operating for 72 hours, please re-lubricate the gear, chain and bearings in gearbox to extend the life of machine parts.

I. Change water in water tank of water cooling system every week to keep circulating water clean.

J. Check gear wear while lubricating. If any bearings or gears are worn out, turn off machine and replace parts to avoid damaging other parts.

K. To lubricating parts, use food grade grease. Do not use oil.

9 TROUBLESHOOTING

PROBLEM	CASE	RECOVERY
1. Some parts of pastry sheet stuck on baking drum.	a. Surface temperature of drum is not uniform.	a. Mark sticking area. Remove cover of drum to tighten or replace heating plate at marked location.
2. Pastry sticks on drum.	a. Pastry sheet not baked well because temperature of drum is too low.	a. Raise temperature accordingly.
3. Pastry sheet not removed from drum by scraper.	a. Gap between scraper and drum is too large.	a. Adjust sheet scraper to touch baking drum correctly.
4. Pastry sheet is not cut apart.	a. Rotary cutter is not sharp. b. Gap between roller and rotary cutter too large.	a. Sharpen rotary cutter. b. Adjust rotary cutter to touch roller and tighten.
5. Spray nozzle is blocked.	 a. Baking drum temperature is too high. b. Temperature of cooling water is too high. c. Impurity or obstruction in batter.	ALL: Stop feeding batter and separate spray nozzle from drum. Clean obstruction from nozzle. a. Decrease baking drum temperature. b. Adjust cooling water temperature to 5 degree C. c. Make proper batter and use batter filter.
6. Too much or too little stuffing deposited.	a. Stuffing propeller rotates too fast or too slow.	a. Adjust the rotation speed of stuffing propeller by changing inverter frequency.
7. Depositing action is not smooth.	a. Movement of deposit mechanism pieces does not match causing incorrect motion.	a1. Adjust length and path of long and short transmission shafts. a2. Adjust position of pressing plate. a3. Adjust timer located in electrical cabinet.
8. Insufficient air pressure.	a. Hose to air compressor has a leak or is not well connected.	a1. Change the hose. a2. Adjust the air cylinder valve.

APPENDIX A: FIGURES & DIAGRAMS

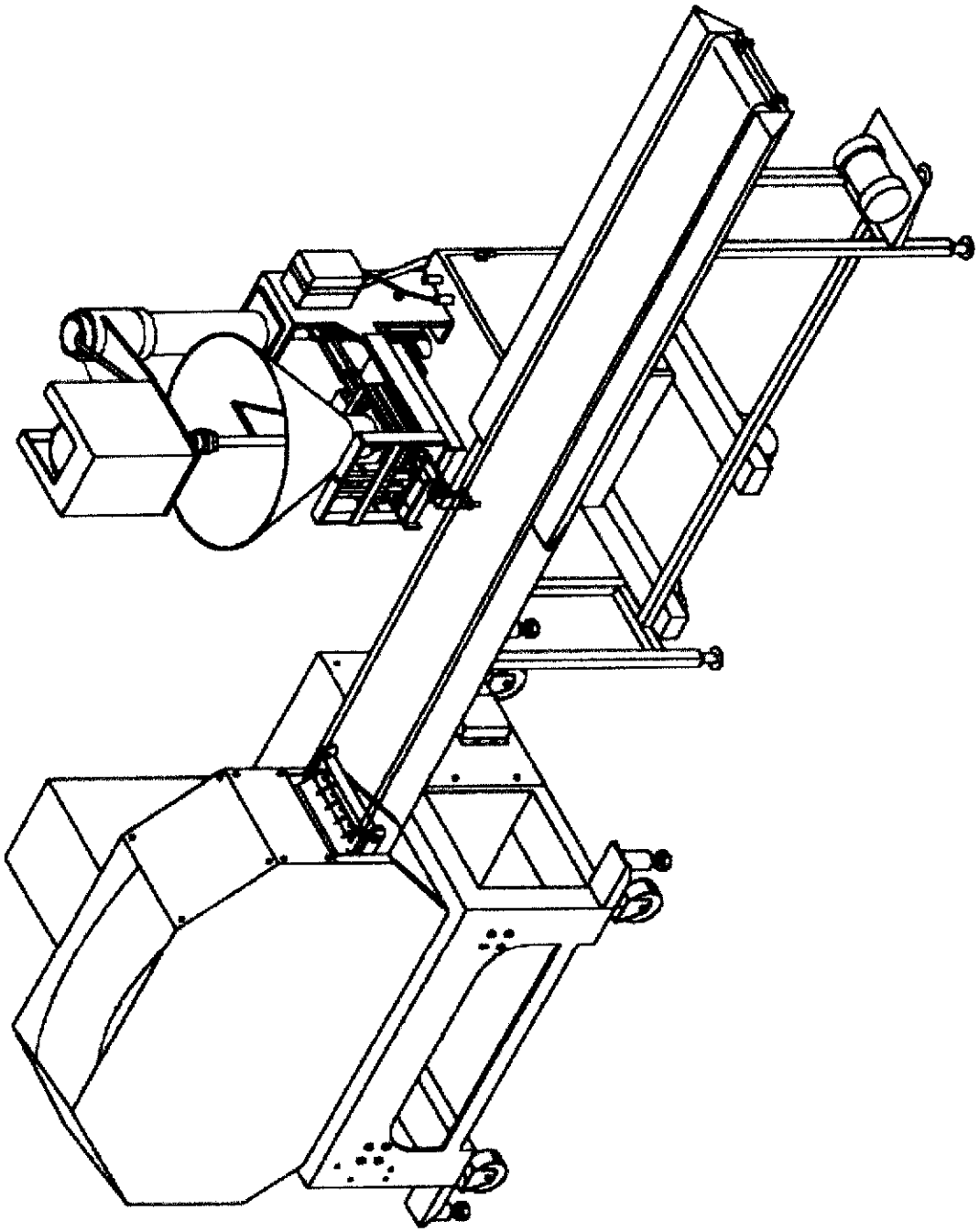


Figure 1: SRPF-20/SRPF-45 production line setup

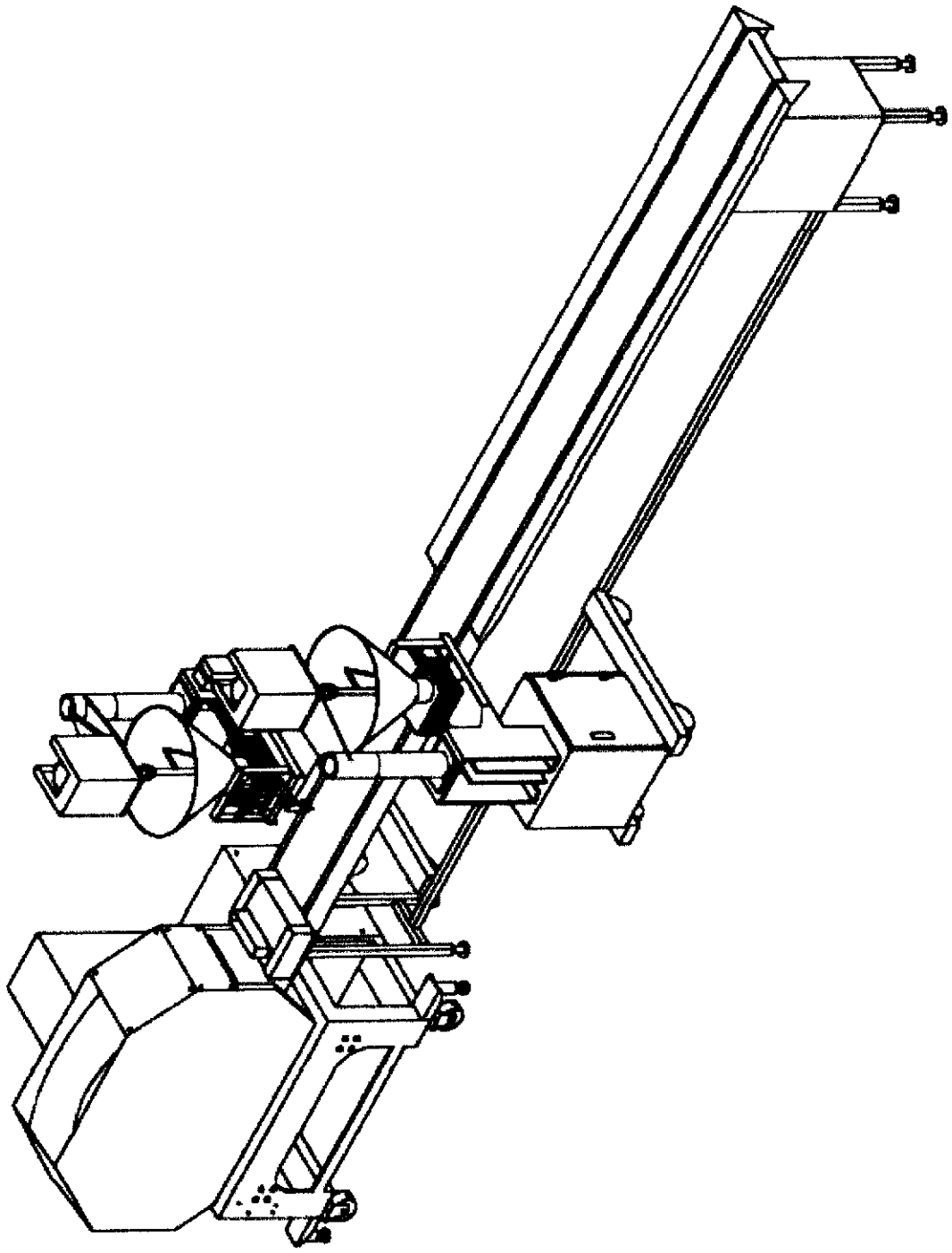


Figure 2: SRPF-90 production line setup and dimensions

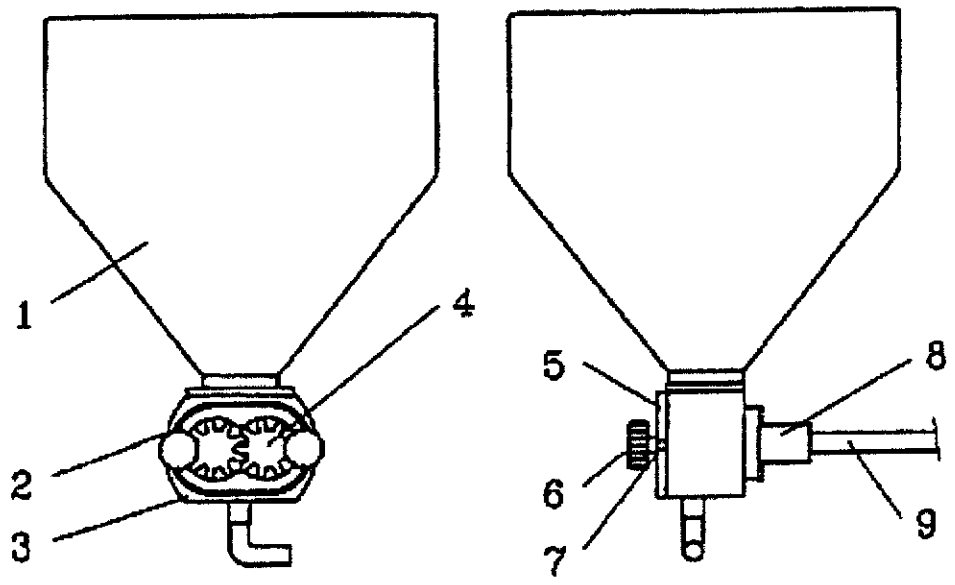


Figure 3: Batter Pump System

1. BATTER TANK	6. KNURLED KNOB SCREW
2. O-RING	7. FIXING SCREW
3. GEAR PUMP BASE	8. COPPER SLEEVE
4. GEAR PUMP GEAR (2)	9. TRANMISSION AXLE
5. ACRYLIC SEAL COVER	

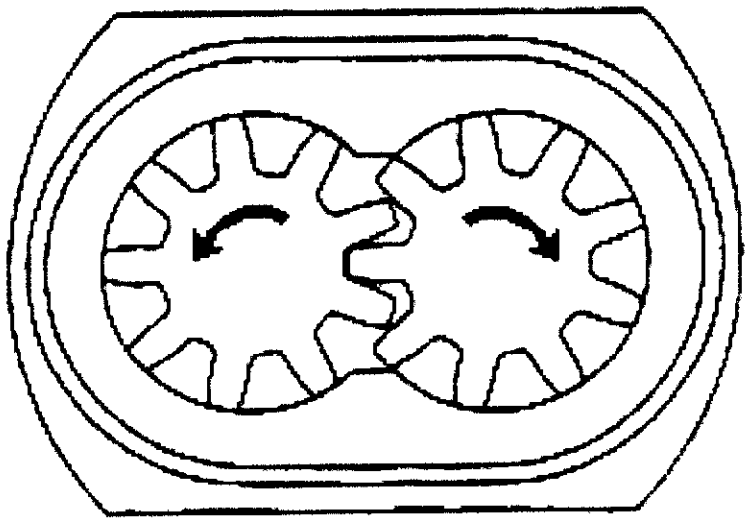


Figure 4: Rotation direction of batter pump gears.

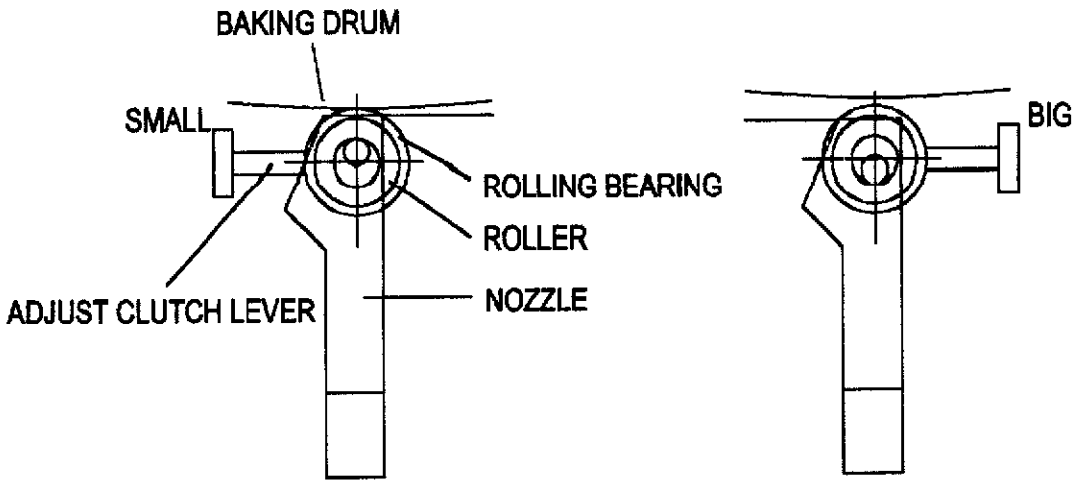


Figure 5: Spray nozzle height adjustment

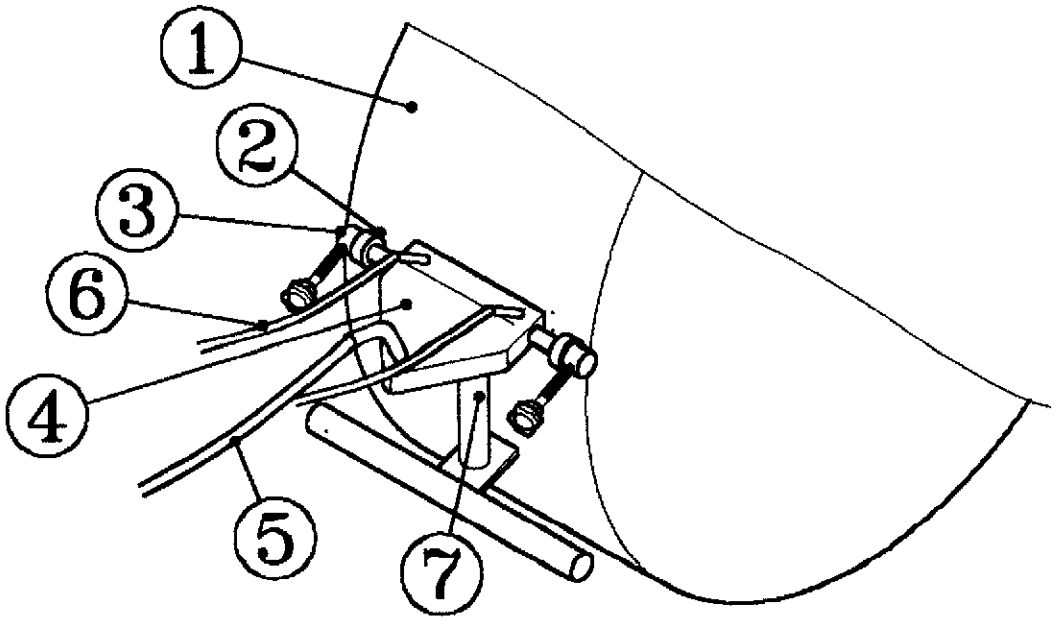


Figure 6: Parts in spray nozzle system.

1. BAKING DRUM	6. INLET/OUTLET OF WATER COOLING SYSTEM
2. ROLLING BEARING	7. SPRAY NOZZLE FIXTURE
3. ROLLER	
4. SPRAY NOZZLE	
5. BATTER FEED TUBE	

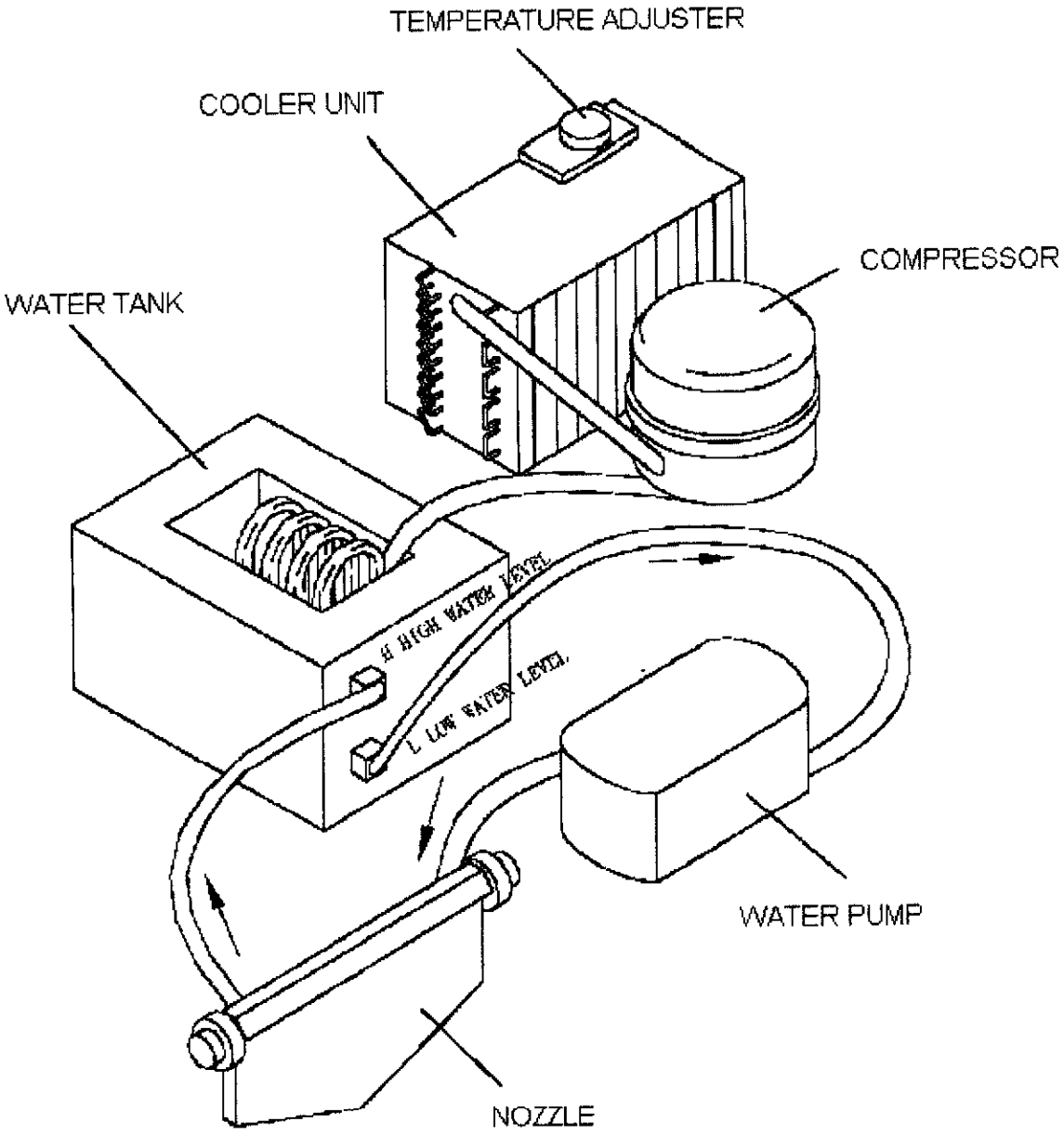


Figure 7: Water cooling system.

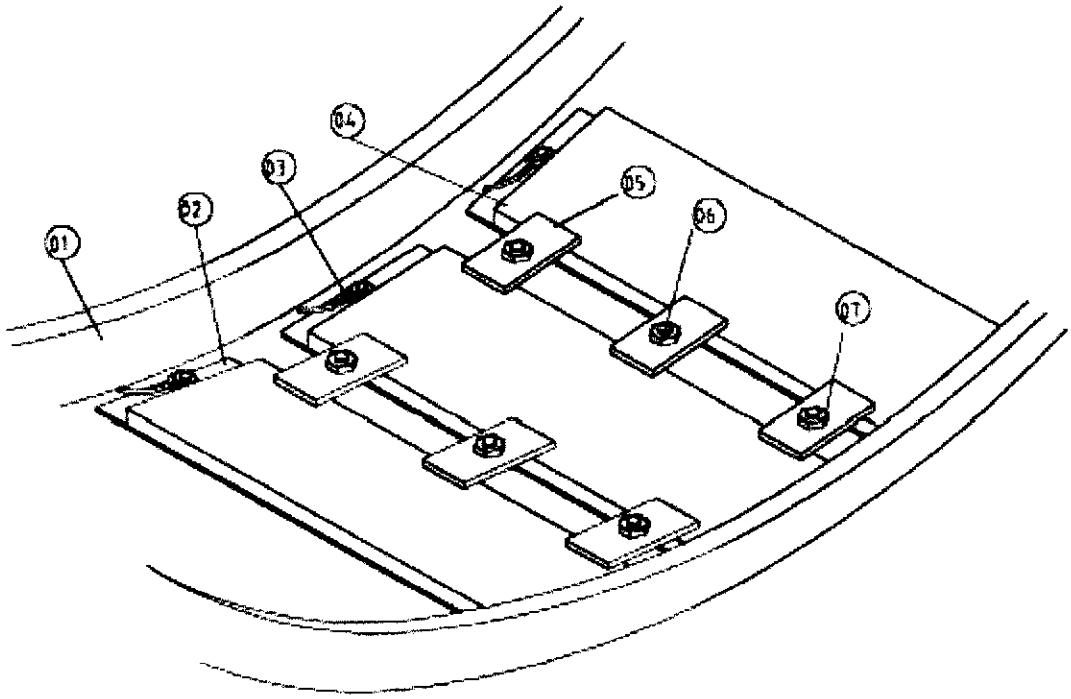


Figure 8: Inside of baking drum (heating plates).

1. BAKING DRUM	5. PRESSING PLATE
2. HEATER PLATE	6. FIXING CUSHION
3. CONDUCTION BOLT	7. FIXING SCREW
4. HEAT INSULATION PLATE	8. FIXING NUT

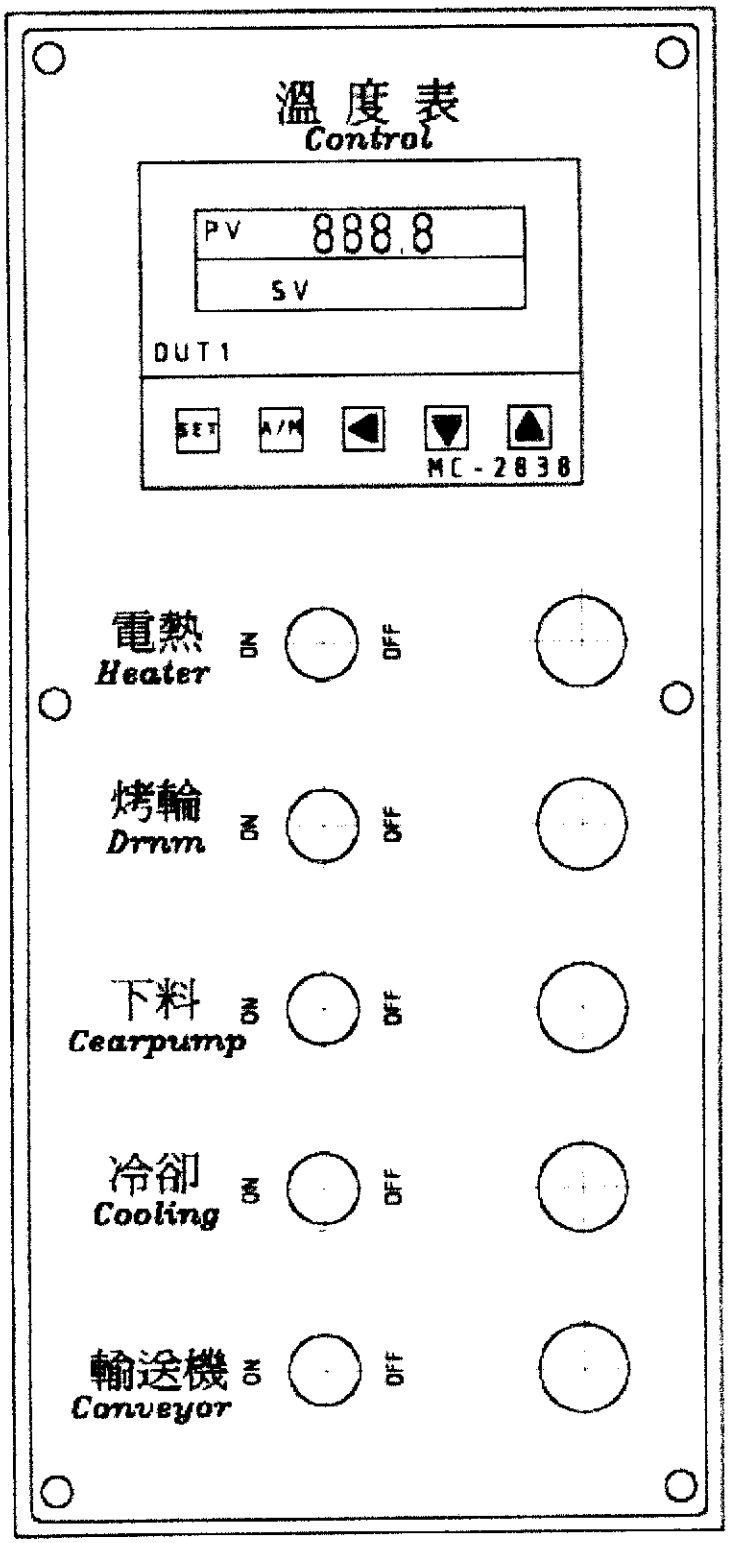


Figure 9: Control Panel of SRPF-20

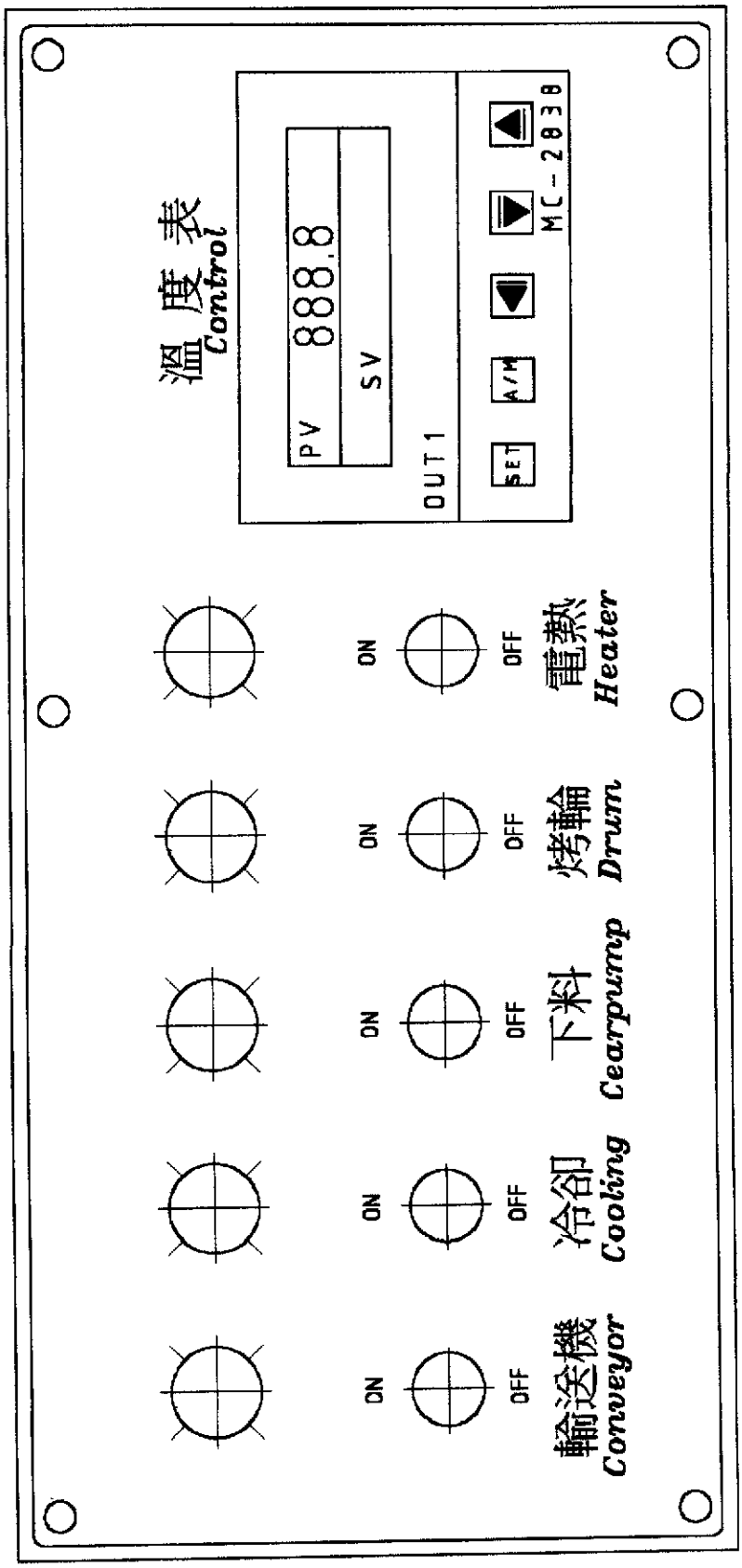


Figure 10: Control Panel of SRPF-45

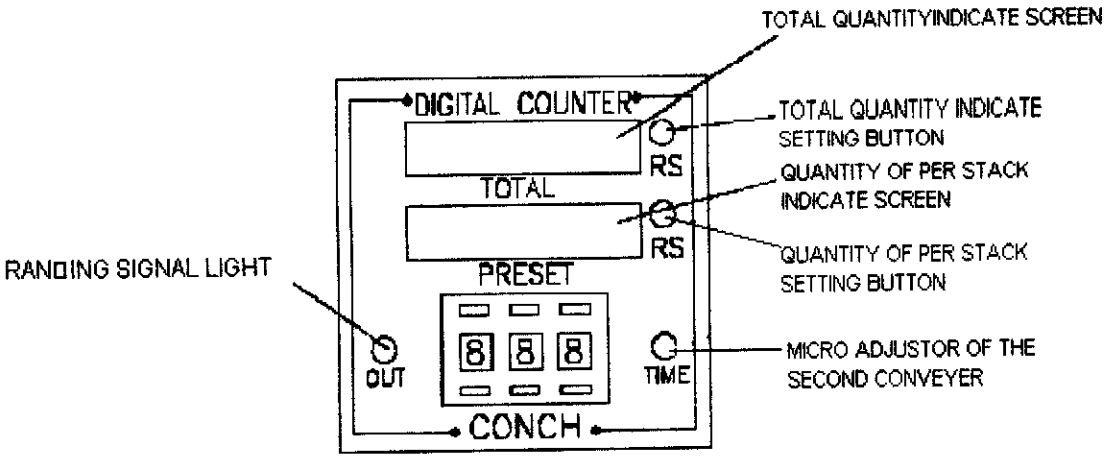


Figure 11 Control Panel view of sheet counter

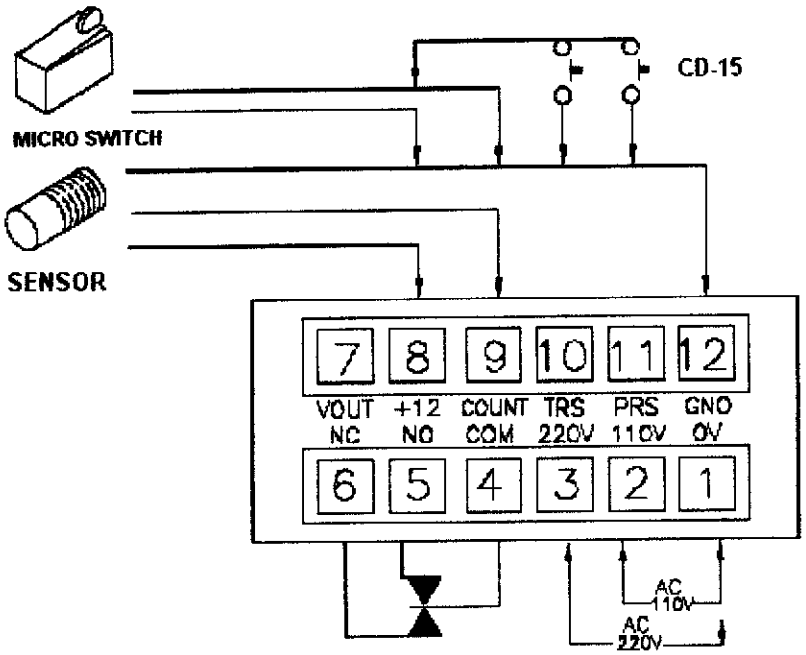


Figure 12 Electrical circuit of sheet counter

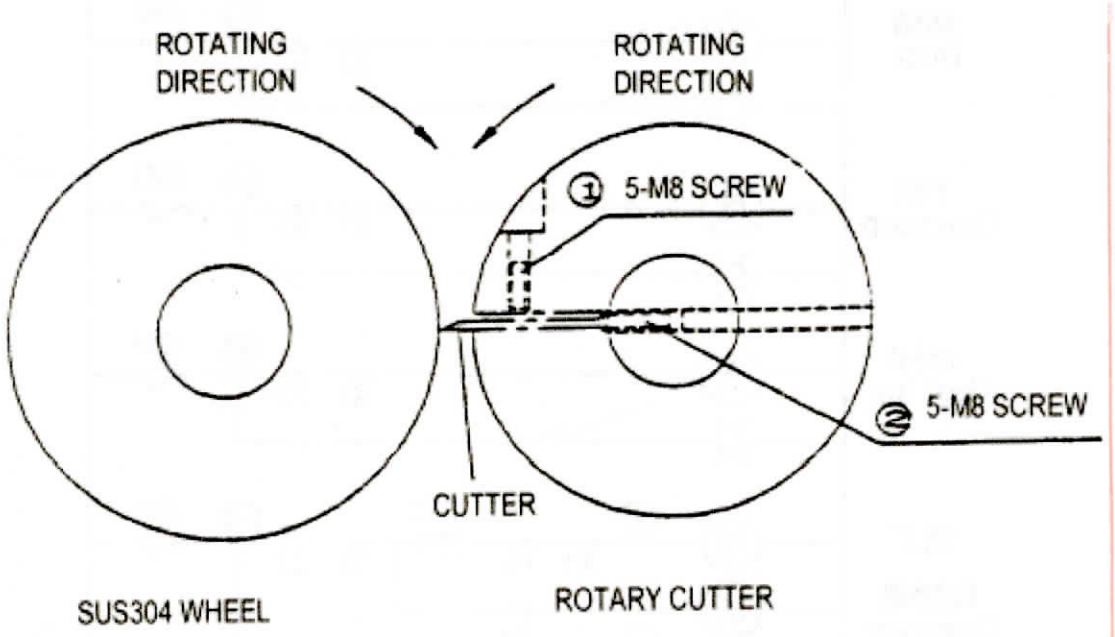


Figure 13: Adjustment of rotary cutter.

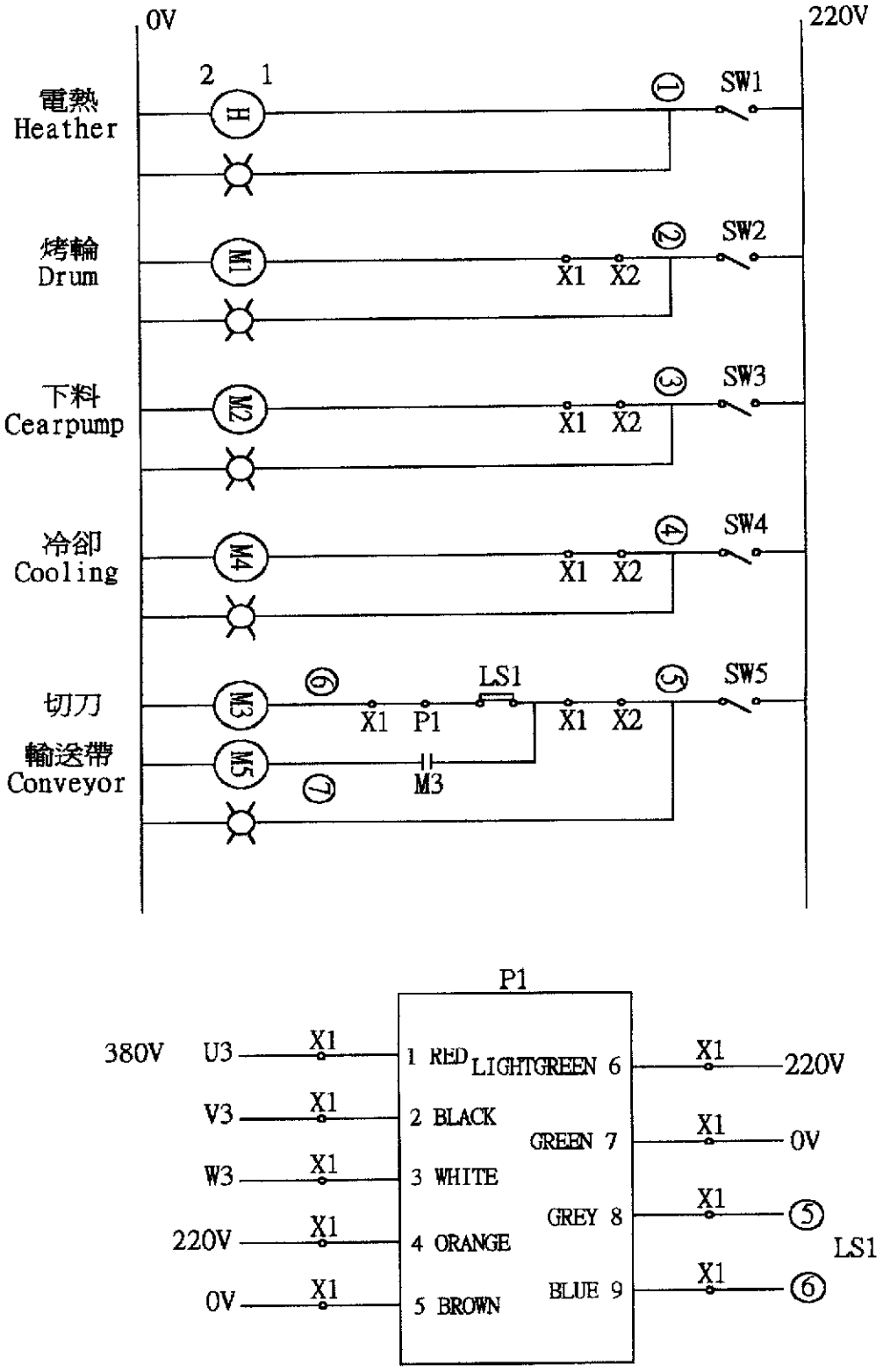


Figure 14: Electrical diagram of Pastry Sheet Making Machine

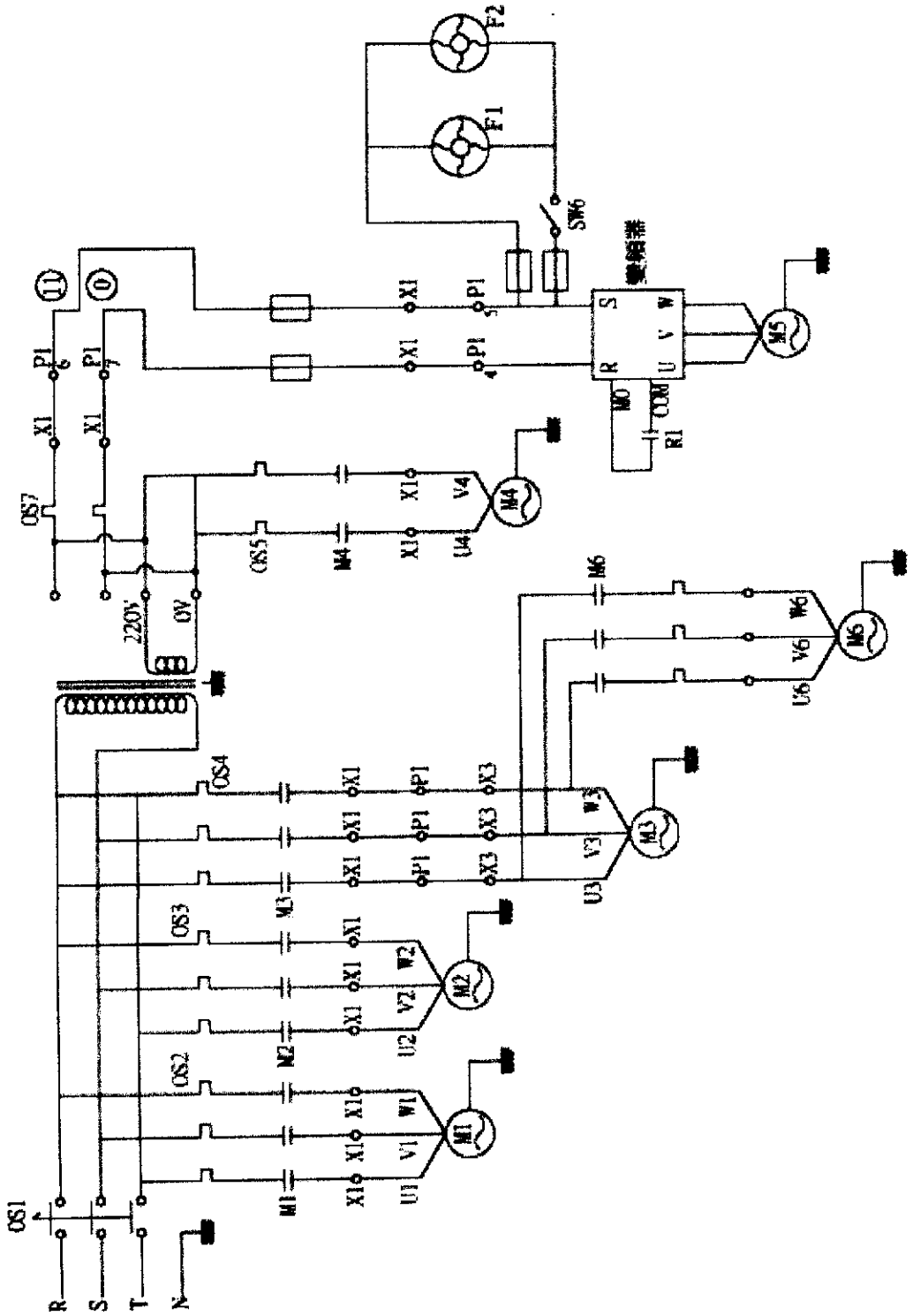


Figure 15: Dynamic drawing of SRPF series machine.

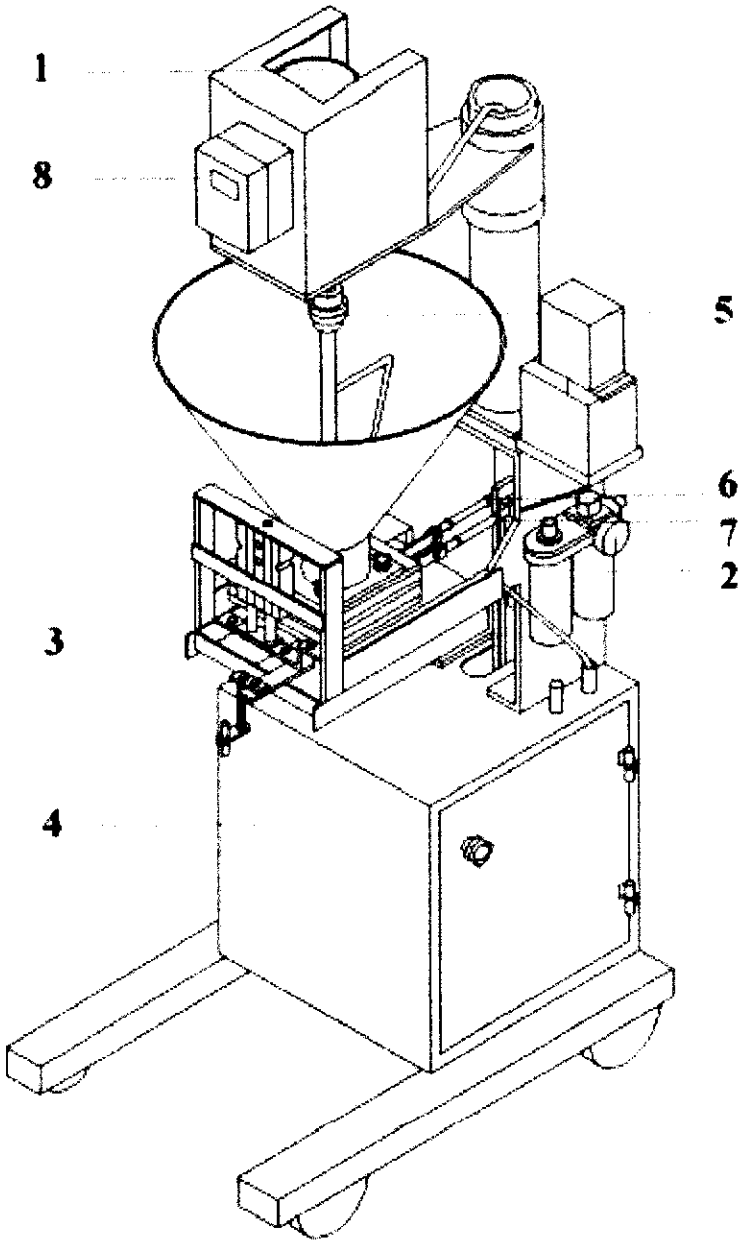


Figure 16: View of stuffing depositor

1	MOTOR	5	AGITATOR
2	AIR CYLINDER	6	LONG MAIN DRIVE STICK
3	DEPOSIT MOLD PLATE	7	SHORT MAIN DRIVE STICK
4	MACHINE FRAME		

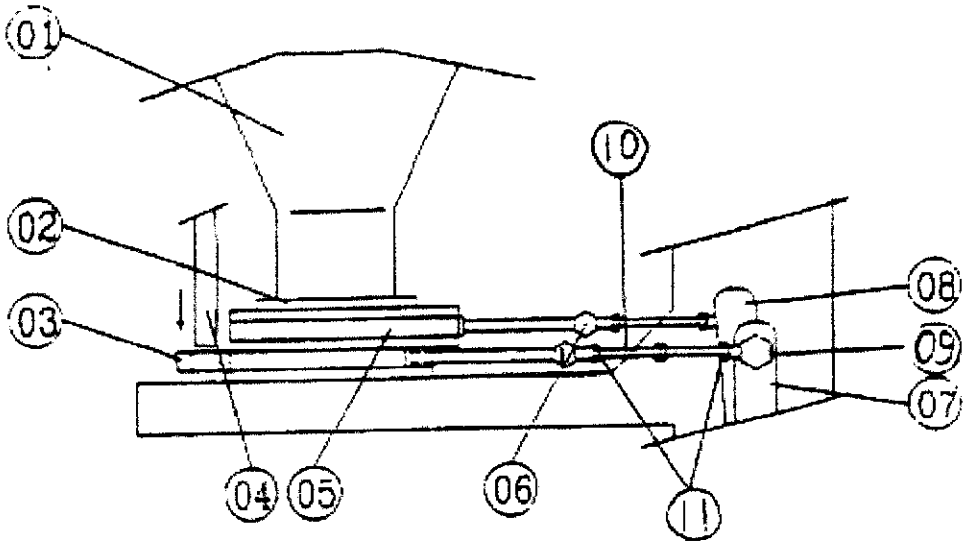


Figure 17: Side view of stuffing depositor mechanism

01	STUFFING HOPPER	06	FISH EYE BEARING
02	FIXTURE PLATE FOR STUFFING HOPPER	07	SHORT MAIN DRIVE STICK
		08	LONG MAIN DRIVE STICK
03	DEPOSIT MOLD PLATE	09	KNURLED NUT
04	DEPOSIT PRESS PLATE	10	ROD
05	UPPER PUSH PLATE	11	ADJUSTMENT NUT

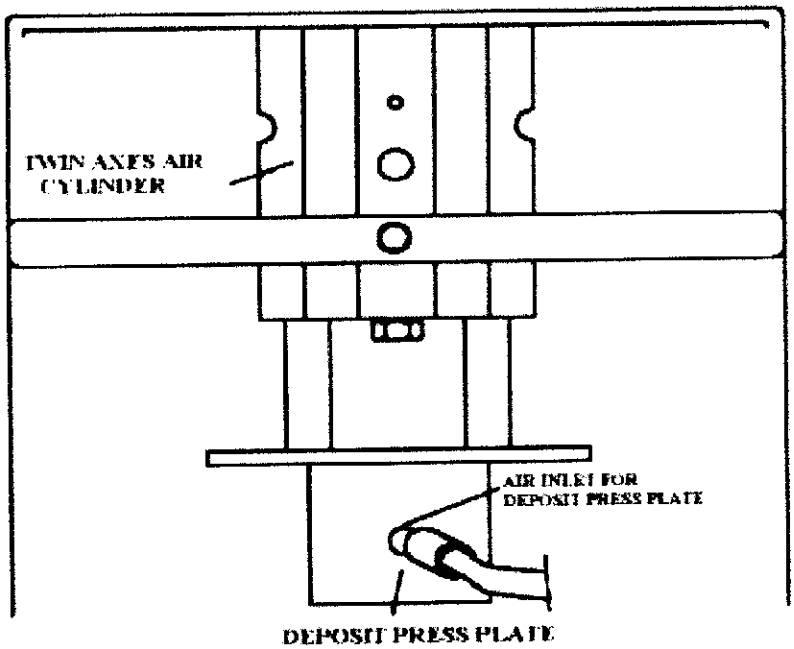


Figure 18: Front view of stuffing depositor mechanism

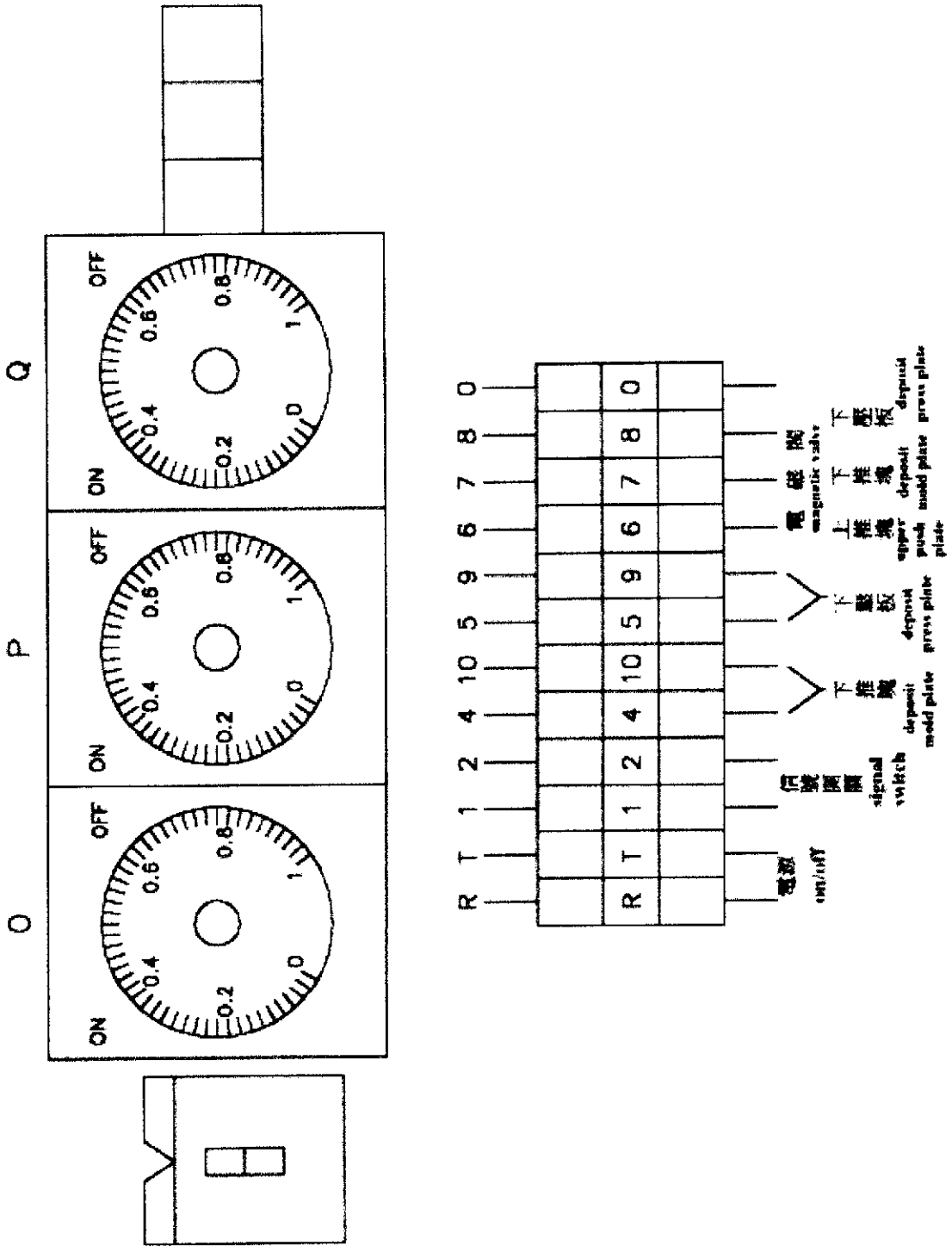
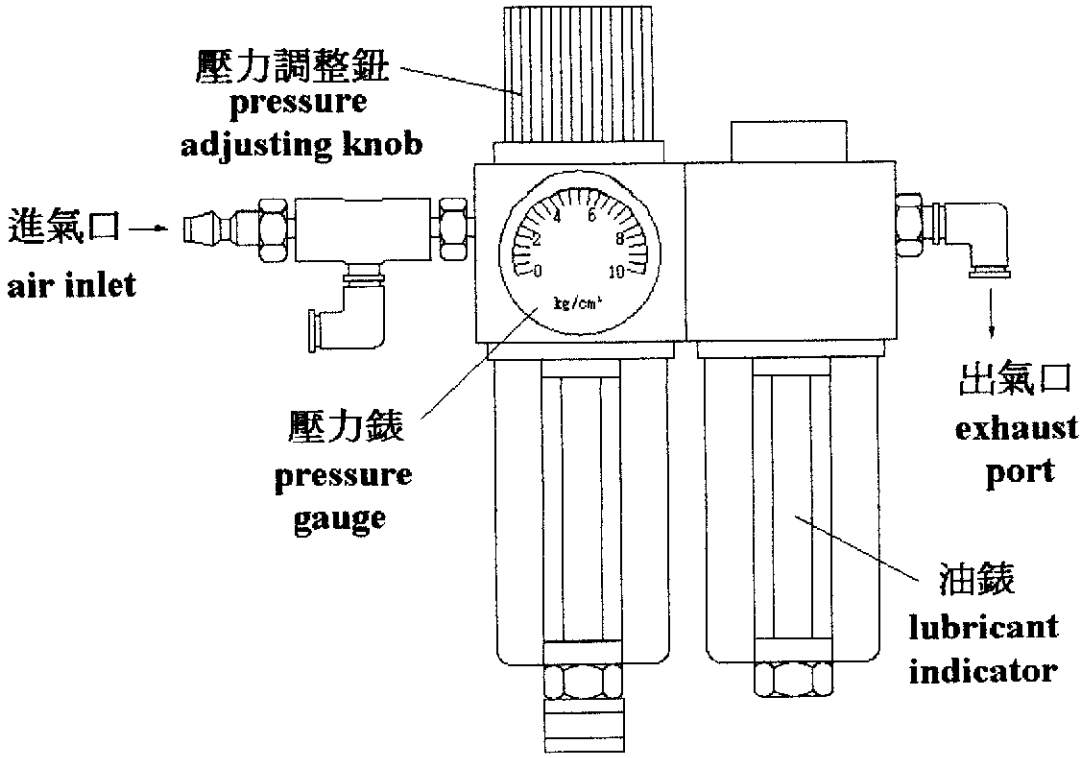


Figure 19 Timers used to adjust stuffing depositor



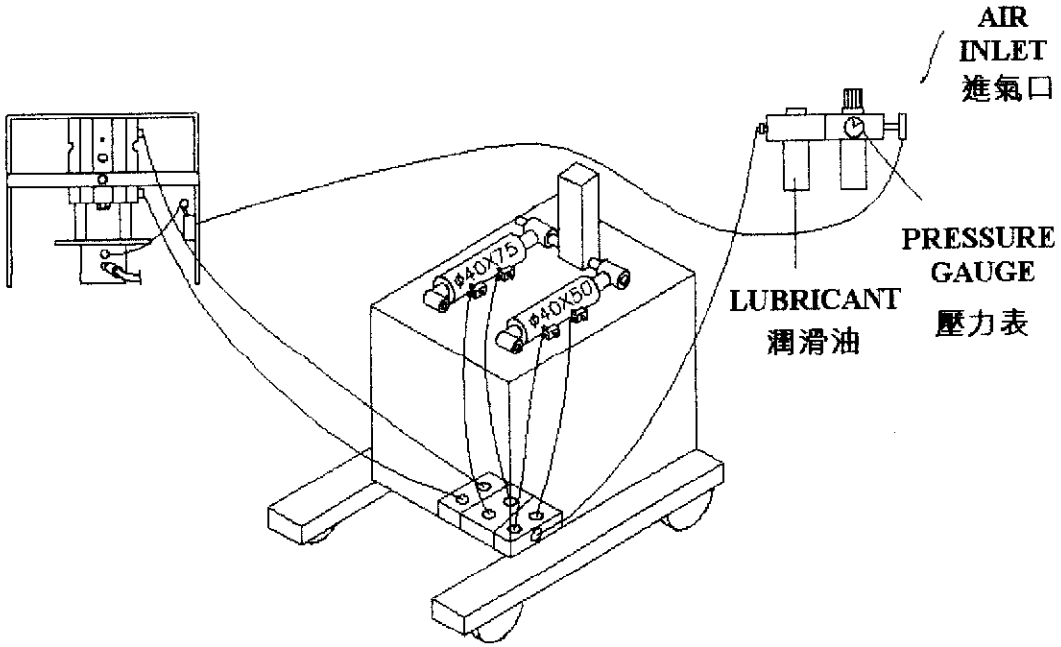


Figure 20: Stuffing Depositor Air Pressure Regulator

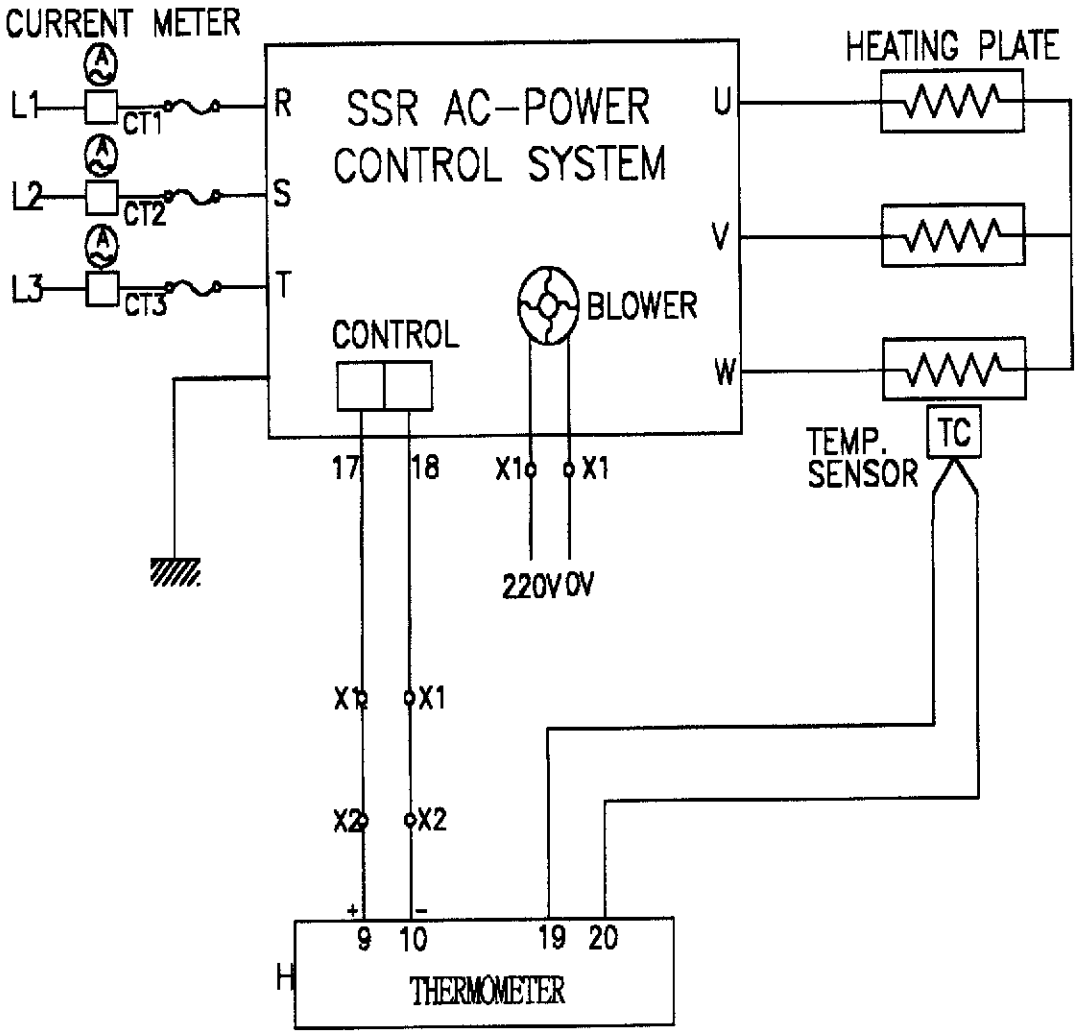


Figure 21 Circuit diagram of temperature controller

下餡機線路圖

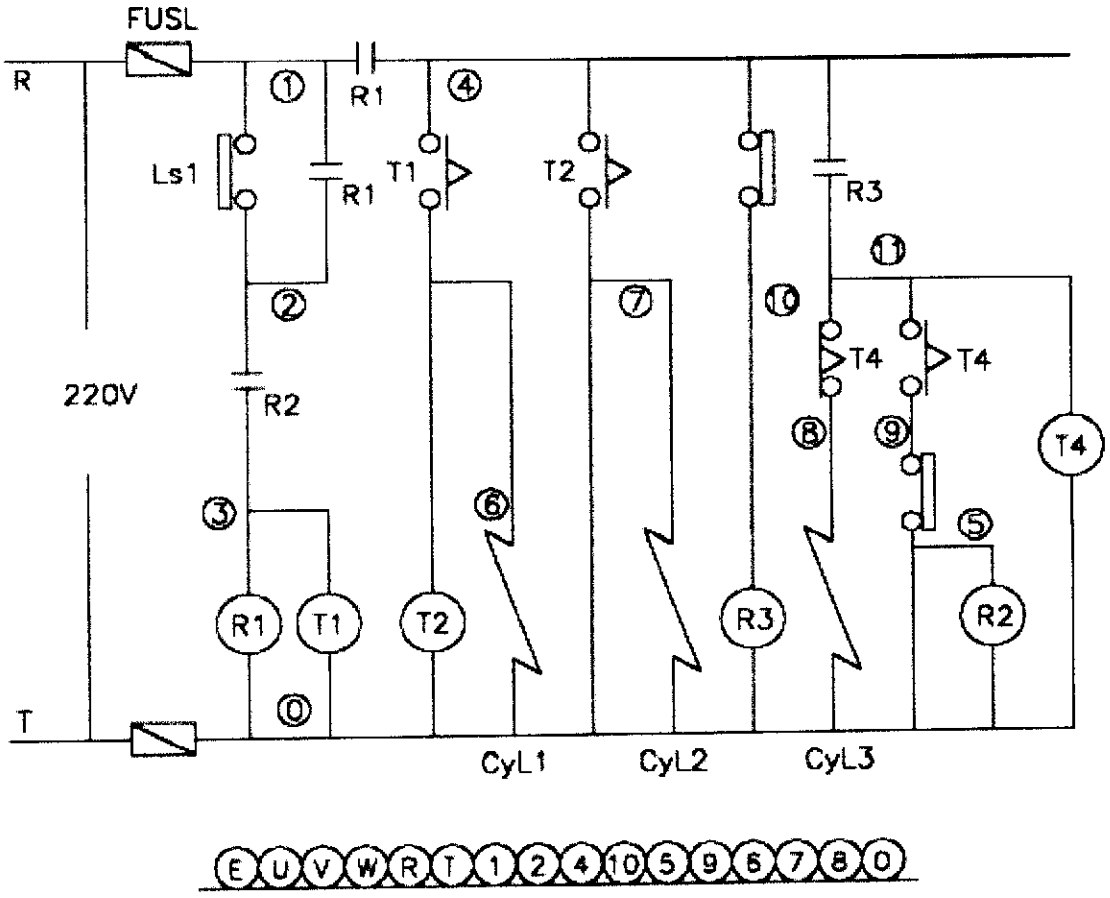


Figure 22: Electrical circuit of stuffing depositor system

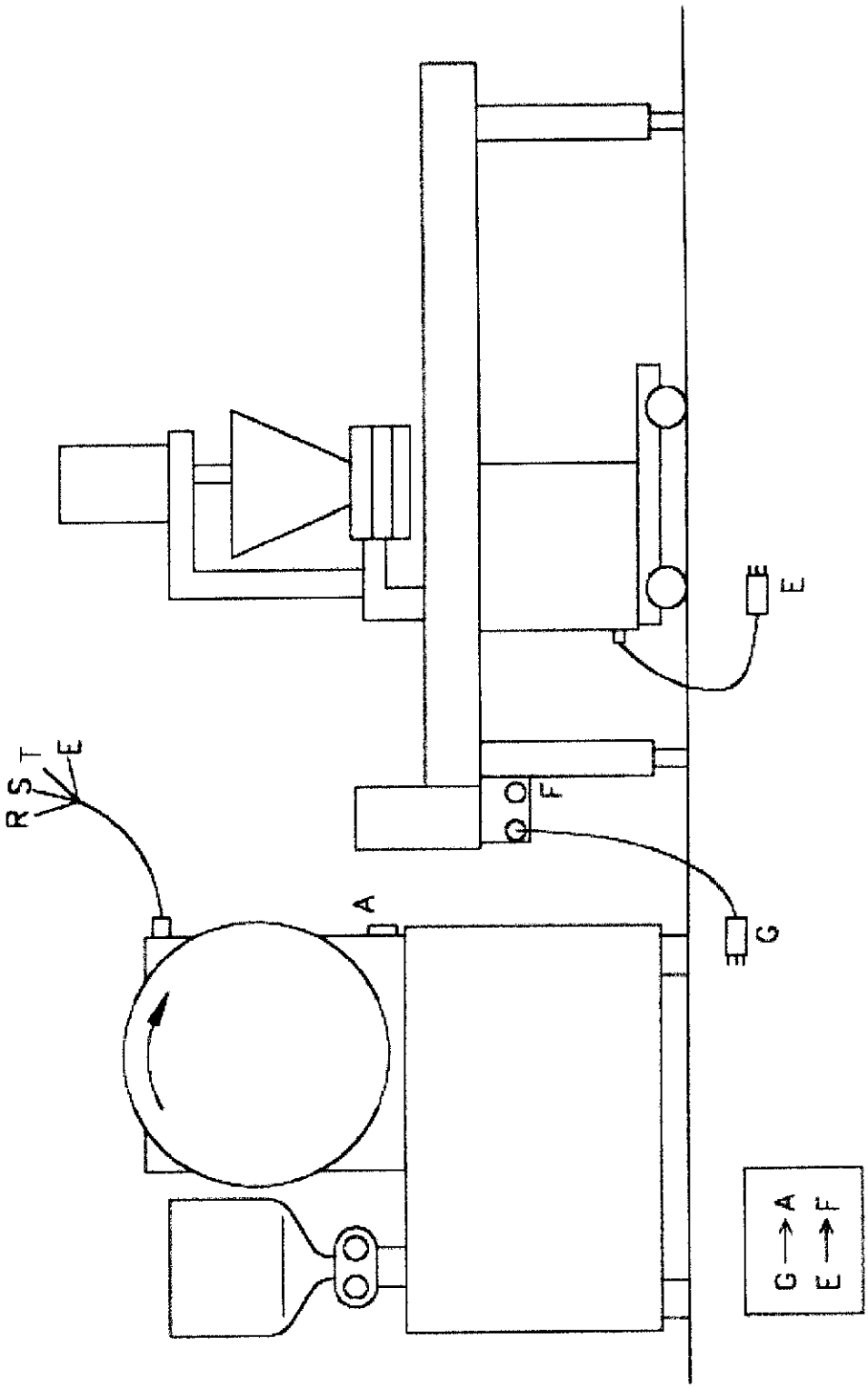


Figure 23: Wiring diagram for cable connectors

APPENDIX B:
INVERTER INSTRUCTION MANUAL