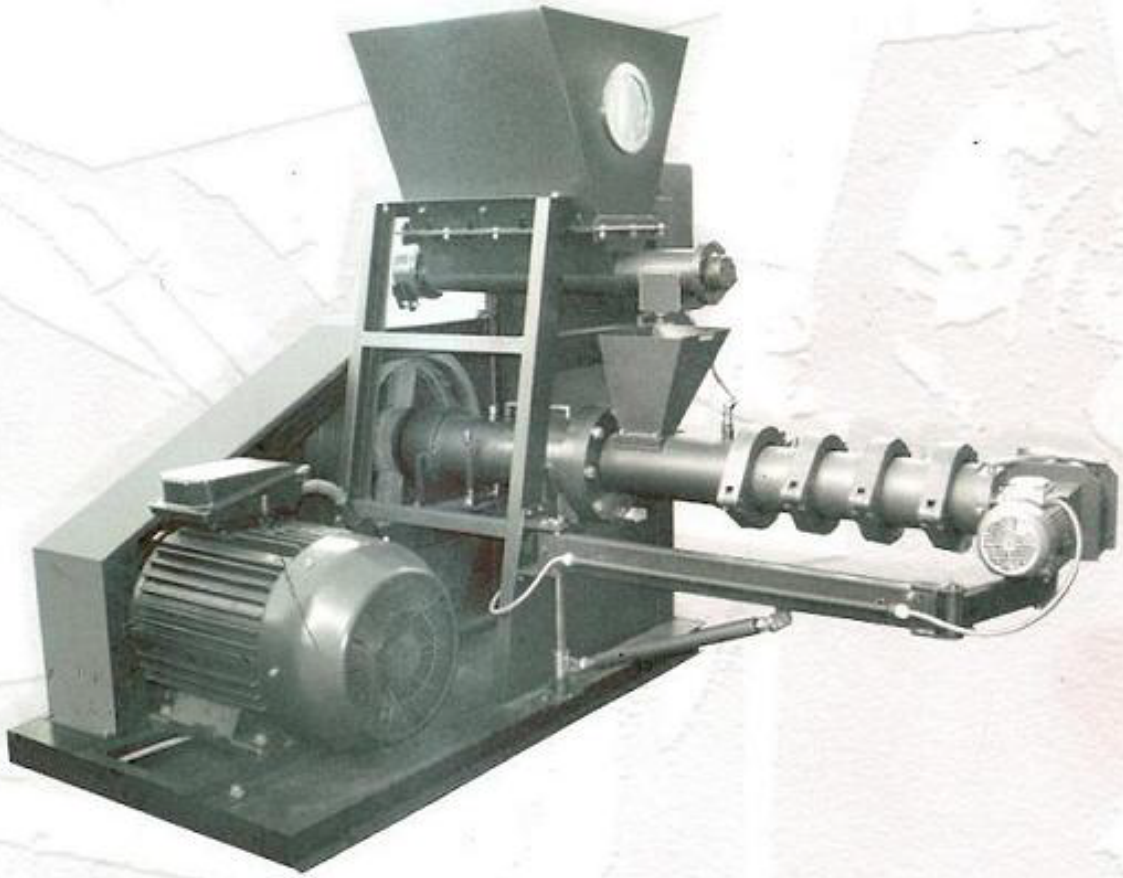
CherkassyElevatorMash

GRAIN EXTRUDER

E-1000 BRONTO



Operating Manual
E-1000 RE

Cherkassy 2008

Contents

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Introduction

1.1. This operating manual's purpose is to familiarize the operating personnel with the structure, technical information, operation and servicing rules of the extruder.

1.2. The extruder's duly performed work as well as its long life depend on correct operating, that is why you should read thoroughly this operating manual before the extruder's mounting and putting in operation.

1.3. This operating manual can be changed and completed as far as we improve our experience and the extruder itself.

1. Purpose

The extruder is purposed for the extruded fodder of wheat, rye, barley, corn, peas and soybeans preparing for farm animals and poultry. The climatic execution is UHL 4.2 according GOST 15150.

2. Specifications

Parameter	Unit	Rate
Performance for cereals and peas (at the feed stock's density = 750 kg/m^3, humidity 12-16%)	Kg/h	up to 700
Performance for soybeans (at the feed stock's density = 750 kg/m^3, humidity 9-12%)	Kg/h	up to 1000
Grain explosivity grade in relative units, at the least, for:		
peas and corn	-	3
other crops	-	1,5
Temperature of the product processed in the homogenization area	K (C)	383-433 (110-160)
Water flow / P=0.5 Mpa (5kgf/cm^2) for cereals At the most	l/min	10
Set power	KW	92.5
Mains supply current		Three-phase four-wire mains of alternating current
Frequency	Hz	50±1
Voltage	V	380^{+10}_{-15}
Dimensions, at the most		
length	mm	2500
width (together with cutting device)	mm	2500
height	mm	2000
Weight, at the most	Kg	2000

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3. Complete set

The extruder's complete set includes:	
1. Assembled extruder	1 piece
2. Spare parts' and accessories' set	1 set
3. Operating manual	1 piece
4. Electric motors' registration certificate	2 pieces

4. Structure and Principle of Operation

4. Structure and Principle of Operation

The extruder consists (fig. 1) of a frame 1, a rotor 2, a screw part 3, a driving actuator 4, a hopper 5, a feeder 6, a cutting device 7, water supply system 8 and control system 9.

4.1. The frame 1 is a welded construction. There is a driving actuator's electric motor installed on it, delivering rotation to the rotor through the V-belt drive.

4.2. The rotor (fig. 2, 3) transmits the rotational motion from the driving actuator's electric motor 4 to the screw part 3; it consists of a case 10, shaft 11 with bearings 52, 53 and 54. A nut 55 locked by two plackets 56 is purposed to control an axial clearance in the bearing 52. Plugs 57 and 58 are purposed for oil feeding and discharge correspondently. Oil indicator 59 controls oil level in the rotor. The tube 60 translers oil pumped by the bearing 52.

4.3. The screw part is purposed for the processed product's transportation, crushing and mixing.

4.3.1. The screw part assembled for cereals' processing (fig. 4) consists of screws 12 (1 pc) and 13 (5 pcs), supporting washes 14 (1 pc) and 15 (3pcs), compensation washers 16 assembled on the shaft 11 and tightened with a left-hand thread nozzle 17, the inlet barrel 18, intermediate barrels 19 and outlet barrel 20 tightened with locks 21.

Sleeves 22, 51 and 23 are built into the barrels 18 and 19. The sleeve 51 is provided with an opening for the valve 34. There is a temperature sensor 35 installed on the last intermediate barrel.

The outlet barrel 20 is provided with a threaded opening where a nut 24 with an outlet sleeve 25 is installed. The barrel 18 and sleeve 22 have matched openings for the receiving cone's 26 installation.

The rotation moment's from the shaft 11 is transmitted to the screws 12 and 13 and washers 14, 15 and 16 through keys 27, 28 and 29.

There are longitudinal ribs made on the inner surface of the sleeves 22, 23 and 51 to provide the product's movement along the screw part's axis.

To exclude the barrels' turning regarding each other the dowels 30 are provided.

Screws 31 are for the axis fixation of the sleeves 22, 23 and 51.

Rings 32 and 33 are installed in the supporting washers' area.

The valve 34 placed on the inlet barrel 18 is purposed for jetting water into the screw part.

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A gap between the nut 24 and nozzle 17, as well as change of outlet plug 25 opening's diameter control the temperature of product processed.

4.3.2. Mounting of the screw part for soybeans processing (fig.5) differs as follows: three double threaded screws 37, support washers 38, three compensation washers 39 and the outlet plug 40 are placed instead of three screws 12 (from the outlet opening's direction), supporting washers 14 and 15, three compensation washers 16 (from the outlet opening's direction) and the outlet plug 25 correspondently.

4.4. The driving actuator consists of an electric motor, a drive pulley, placed on the electric motor's shaft through the collet, a V-belt drive and a driven pulley, installed on the shaft 11 through the collet as well.

4.5. The hopper 5 serves for intermediate accumulation of grain necessary for the extruder's trouble-free start and stop.

4.6. The feeder 6 (fig. 6) controls the raw product's supply to the extruder's screw part. The feeder itself is a screw conveyor, with the screw 41 rotating from the motor-reducer 42. The screw 41 takes the raw product from the hopper 5, and then the grain comes to the receiving cone 26 through the nozzle 43 (fig.4). Control the raw product supply by changing the screw 41's rotation frequency. A magnetic catcher installed in the cone will exclude any foreign steel things' getting into the screw part.

4.7. The cutting device 7 consists of a crusher shaped as a spiral, where a rotor with blades rotates. The rotor receives rotation from the electric motor installed together with a spiral on the platform. The platform, in its turn, is connected with the frame via the revolving brackets' system. The crusher is driven away in the off-position. In on-position the crusher's feed throat is put on the washer 24 (fig.4) and fixed with a specially intended grip.

4.8. The water supply system (fig. 7) serves to moisten the base mixture and consists of the tap 44, manometer 45, adjusting cock 46, rotameter 47 and a valve 34 (fig. 4).

4.9. The extruder's control system is placed into the control box 9 (fig.8) The electrical schematic is presented in the fig. 9. It is a metal welded box with an opening door, where operational control devices and visual control devices are installed.

The purpose of operational control and visual control devices is as follows:

The circuit breaker **ON, OFF** serves for voltage supply into the control box.

The **START** button serves for voltage supply to the switches.

The **STOP** button serves for emergency de-energization of the control circuits.

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- **EXTRUDER START / STOP** switches on (off) the driving actuator's motor.
- **CUTTING DEVICE START / STOP** switches on (off) the cutting device's electric motor.
- **FEEDER START / STOP** switches on (off) the cutting feeder's electric motor.
- **GRAIN SUPPLY** control device controls the feeder's output.
- **VOLTAGE** signal fittings control the voltage availability.
- **DRIVING ACTUATOR'S CURRENT** ammeter controls the load of the driving actuator's motor.
- **FREQUENCY**, Hz controls the current frequency of the feeder's electric motor.
- **TEMPERATURE** numeric display shows the temperature in the homogenization area of the extruder's screw part.

WARNING!

The digital ammeter serves to protect the extruder's electric motor. Before the electric motor start check up (change if necessary) settings of the digital ammeter. Do not start the motor with the blocked contact of the digital ammeter or with wrong settings.

The digital ammeter's settings:

L_o - minimal value 000A
H, maximal value 195A
d, dwell 003c
C, transformer currency 200A

In emergency situations the digital ammeter stops the voltage supply on the control scheme, disabling thus the further work of the extruder.

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For electrical cabinet powering use copper thread wires of the least cut 70 mm^2, for aluminum thread wires the least cut is 90 mm^2.

4.9.1. The extruder works as follows:
The base mixture is supplied into the extruder's hopper from the internal supply system. When the electric motor and then feeder are on, the mixture comes into the receiving cone and further into the screw part from the hopper.
When passing the screw part the mixture is milled and is treated thermally, then it mixes under pressure and is pressed out from the extruder.
The mixture is heated due to friction within the process when the mixture moves along the screw part.
The proceeded cereals come out from the outlet plug's opening braid-shaped. The cutting device's blades crush the product as far it comes out from the screw part. The cutting device is not used at soybeans processing.
Adjust the process temperature and grain explosivity grade by the clearance change between the nut 24 and the nozzle 17 (fig. 4), as well as by change of the outlet opening's surface. Reducing of the clearance or the outlet opening's surface results in raising the product's temperature and explosivity grade; and vice versa increasing of the clearance or the outlet opening results in the temperature's and explosivity grade's drop.
To make the cereals and peas processing steady they are to be moistened with the water supply system.
The extruder is started and stopped and its output is controlled from the control box.

5. Safety Measures

5.1. Operation of this equipment is to be carried out by personnel qualified to complete this work only, with document certifying their right to operate the extruder.
5.2. The operator working on the extruder wears special working clothes, a head-dress, he must use heat-resistant gloves.
5.3. The premises where extruders are installed are to be equipped with mandatory exhaust ventilation. Quantity of dust and vapor in the working area's air must not exceed the legitimate values prescribed by regulations of GOST 12.1.005-88. It is prohibited to switch on the extruder with the ventilation off.
5.4 The extruder's foundation is to be earthed.

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5.5. The operator should not remedy any defects in electric equipment. The electrician on duty is to be called for.

5.6. Do not stand opposite the outlet opening of the screw part during the start, adjusting and operation of the extruder, as the complete process is connected with high temperature and high pressure.

5.7. Do not push the mixture through with hands or any gears into the receiving cone, do not remove extraneous things from the magnetic catcher when the extruder is on. If any trouble happens stop the extruder.

5.8. Do not start the extruder without protective shroud on the V-belt drive and cutting device.

5.9. It is absolutely prohibited to start the extruder with the clogged product or partially closed opening of the screw part's outlet plug. It is necessary to remove the plug with the outlet device and to clean the opening.

5.10. WARNING Do not clean the outlet plug's opening when the extruder is on.

5.11. The maintenance staff MUST NOT stay opposite the screw part when the outlet plug is being dismounted.

Where it is necessary to take off fasteners for the barrels' disassembling, take into consideration that those may be thrown forward due the mixture's processed pressure, and the hot mixture may get into eyes and face. That is why when the screw part is clogged we recommend disassembling the plug or the outlet and intermediate barrels, at their temperature 40°C.

5.12.Use a scoop when taking a sample of the base mixture at the outlet of the feeder's tray. Do not take a sample with hands.

5.13. In emergency situations do the emergency switching of the extruder: switch off the electric motors of the cutting device's and the feeder with the fungiform button "EMERGENCY STOP".

5.14. Do not disassemble the screw part when the temperature of the parts exceeds 90°C and without gloves.

5.15. Do not work with defective instruments.

5.16. Turn a spanner on the outlet openings of the screw part when the extruder is on in gloves only to avoid bums.

5.17. Do not use a spanner extension for tightening nuts on the fasteners.

5.18. Acoustic pressure and vibrational load at the operator's working place do not exceed the values established by the GOST 12.1.003-83 and 12.1.012-90 correspondently.

5.19. No hazard substances escape into the environment during the extruder's operation.

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6. Extruder's Assemblage

6.1. The extruder is to be installed on the plain horizontal surface on the floor or concrete base with the most inclination 5 mm for 1 m length. At that there must be a free surface 1000 mm at least - in front of the screw part.
6.2. The extruder's location above the curb level may differ depending on location of the base mixture supply and final product discharge.
6.3. The system supplying base mixture must be connected to the extruder, as well as the final product receivers and ventilation.
6.4. Check up oil in the extruder's rotor and in the reducer of the feeder's drive before putting in operation.

7. Preparation and Order of the Extruder's Operation for Cereals and Peas Processing

Assembly the screw part according to the fig. 4. Supporting washers' diameter in the product's movement direction: one (pos. 14, fig. 4) - 130 mm and three (pos. 15, fig. 4) 136 mm. NOTE: A part of coil must be removed in single- and double-threaded screws where they fit to support washers, both from the direction of a cone and washer backside. The clearance between a screw coil and a washer edge must be 9...10 mm. If your replace screws without the described updating, the latter should be done by means of hand polishing tool.

7.1.Set the outlet plug of the required diameter depending on processed cereal.
7.2. Extruder start
7.2.1. Loosen the nut 24 for 4 turns from the starting position (tightened up to the stop) and fix it with a lock.
7.2.2. The cutting device is driven aside.
7.2.3. Switch on the driving actuator's motor with EXTRUDER START / STOP.
7.2.4. Switch on the feeder's driving actuator with the FEEDER START / STOP switcher, increasing gradually grain supply. Simultaneously with the first portion of grain add 0.7...1.2 liters of water by 0.1...0.15 liters portions every 3...5 sec into the receiving corner.
7.2.5. As soon as the product is discharged as a continuous braid regulate the water supply, and the stable explosion of the product is available at that. Enable the cutting device's motor with the CUTTING DEVICE START / STOP switcher and put the cutting device in its on-position.
7.2.6. When the barrels are heated up to 70...90°C, set the grain supply up to the rating value of the motor's current strength (167A)
7.2.7. If necessary moisten the processed product using the water supply system.

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NOTE. Where the start is improper the extruder's screw part can be "clogged up"; the evidence of this is as follows: grain is supplied into the receiving cone, but does not discharge out from the screw part; as a result the current load at the driving actuator's motor increases, and then it sharply drops.
If such "clogging up" up happens de-energize the extruder.
Disassemble the screw part, clean and examine parts of the screw part to find out any defects. If the screw part is defect-free, assemble it and re-start as described above.

7.3. Operating Mode

7.3.1. When the extruder is started, the mode where its output, process temperature and current load of the electric motor must correspond to the rating value, is set.

7.3.2. Where the extruder is mode-operated the operator must monitor functioning of all extruder parts, the process temperature, water supply and final product's quality. If the temperature does not correspond readjust it as described in the item 7.5.

The operator must do control tests of the base mixture's composition and density, of the output and the final's product quality.

7.3.3. The operator must examine the magnetic catchers twice at least during a shift.

7.3.4. The operator must control the load of the main drive's motor and power supply at all phases.

7.4. Extruder stop

7.4.1. Switch off the feeder with the FEEDER START / STOP switcher.

7.4.2. Stop the water supply.

7.4.3. When the product is not discharged out from the screw part any more, switch off the main drive's motor with the EXTRUDER START / STOP switcher.

7.4.4. Switch off the cutting device's motor with the CUTTING DEVICE ON / OFF switcher.

7.4.5. Stop the power supply into the control box's scheme with the STOP button.

7.4.6. De-energize the control box with the OFF circuit breaker.

7.4.7. Drive the cutting device into the starting position.

7.4.8. Disassemble the output unit together with parts installed on it, install the E-1000.50.00.002 ring instead, switch on the driver's electric motor and turn the screws through to remove the mixture.

7.4.9.Clean the output unit's cavity and the opening in the outlet plug.

7.4.10. Tighten nuts of locks with standard spanners only. Do not use any levers or tubes to increase the tightening torque. Normal tightening torque is 150 N/m (15 kg-force/m)

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7.5. Rating change, adjusting and setting.

7.5.1. The explosivity grade is determined as the weight ratio of equal volumes of comminuted grain and comminuted ready-made product.

The weight of equal volume of comminuted grain or grain mixture must 3 times (for peas and corn) and 1.5-2 times (for other cereals) exceed the weight of comminuted ready-made product. Practically it may be done as follows. Bolt comminuted grain and ready-made product. To determine the explosivity grade take a fraction from a 1 mm and 2 mm hole size bolter.

Weight volumes of raw material and extruded article using technical scales to within 0.1 g.

The explosivity grade is calculated by weight ratio of volumes.

7.5.2. The output can be determined when the 100% current load of the main motor, the ready product's quality is satisfying, the temperature corresponds to the set one. Weight the mass discharged from the outlet opening of the screw part within 3 minutes. The result multiplied by 20 is the hourly consumption (output). To reduce the output to the conditional density of 750 kg/m^3 multiply the output measured quantity by the coefficient, received as a quotient of division of conditional and actual density.

7.5.3. The process temperature's is checked up by the control board's reading.

7.5.4. If the process temperature does not correspond to the set one, the water flow has altered and the proper quality of the final product results impossible, install the outlet plug of other diameter. The plug of less diameter will increase the temperature and inverse more diameter will result the temperature drop.

7.5.5. The described temperature setting is the main one. You should take into consideration that the raw material's humidity increased by 1% reduces the process temperature by 10°C; thus if achieving of the set temperature results impossible it is necessary to check up the raw material's humidity. The optimal humidity:

- corn14.3...15.3%- wheat14.7...15.7%
- barley14.5...15.5%- peas15.5...16.5%

NOTE: Do not add any water for extrusion with the mentioned humidity of the raw product.

7.5.6. If requirements of the item 7.5.7. Have been met this will increase the explosivity grade.

7.5.7. Other ratings specifying the product quality are evaluated in a lab via the special techniques.

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8. Preparation and Order of the Extruder's Operation for Soybeans Processing

Assembly the screw part according to the fig. 5. Diameter of all s upporting washers is 139.7 mm (pos. 38, fig. 5).

8.1. Extruder start:

8.1.1.Loosen the nut 24 for 4 turns from the starting position (tightened up to the stop) and fix it with a lock.

8.1.2.Take off the outlet barrel and heat it up to 90-100C

8.1.3.Install the outlet barrel.

8.1.4.Switch on the driving actuator's motor with EXTRUDER START / STOP.

8.1.5. Switch on the feeder with the FEEDER START / STOP switcher and supply grain into the receiving cone, increasing supply gradually. Mass must constantly discharge out from the nozzle. Current strength must not exceed the nominal value (167A)

NOTE. Where the start is improper the extruder's screw part can be "clogged up"; the evidence of this is as follows: soybeans are supplied into the receiving cone, though do not discharge out from the screw part; as a result the current load at the driving actuator's motor increases, and then it sharply drops.

If such "clogging up" up happens de-energize the extruder.

Disassemble the screw part, clean and examine parts of the screw part to find out any defects. If the screw part is defect-free, assemble it and re-start as described above.

8.2. Operating Mode

8.2.1. When the extruder is started, the mode where its output, process temperature and current load of the electric motor must correspond to the rating value, is set.

8.2.2. Where the extruder is mode-operated the operator must monitor functioning of all extruder parts, the process temperature, water supply and final product's quality. If the temperature does not correspond readjust it according to the technique described in the item 7.5. The operator must do control tests of the base mixture's composition and density, of the output and the final's product quality.

8.2.3. The operator must examine the magnetic catchers twice at least during a shift.

8.2.4. The operator must control the load of the main drive's motor and power supply at all phases.

8.3. Extruder stop

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8.3.1. Switch off the feeder with the FEEDER START / STOP switcher.
8.3.2. When the product does not discharge out from the screw part any more, switch off the main drive's motor with the EXTRUDER START / STOP switcher.
8.3.3. Stop the power supply to the control box's scheme with the STOP button.
8.3.4. De-energize the control box with the ON/OFF circuit breaker.
8.3.5. Disassemble the output unit together with parts installed on it, install the E-1000.50.00.002 ring instead, switch on the driver's electric motor and turn the screws through to remove the mixture. Disassemble other barrels as described above.
8.3.6.Clean the output unit's cavity and the opening in the outlet plug.
8.3.7. Tighten nuts of locks with standard spanners only. Do not use any levers or tubes to increase the tightening torque. Normal tightening torque is 150 N/m (15 kg-force/m)
8.4. Rating change, adjusting and setting.
8.4.1 The output is determined when the 100% current load of the main motor, the ready product's quality is satisfying, the temperature corresponds to the set one. Weight the mass discharged from the outlet opening of the screw part within 3 minutes. The result multiplied by 20 is the hourly consumption (output).
8.4.2. The process temperature's is checked up by the control board's reading.
8.4.3. If the process temperature does not correspond to the set one and the proper quality of the final product does not meet the set requirements, reduce the clearance between the nut 20 and nozzle 36 or reduce the feeder's output.
8.4.4.The described temperature setting is the main one. You should take into consideration that the raw material's humidity increased by 1% reduces the process temperature by 10°C; thus if achieving of the set temperature results impossible it is necessary to check up the raw material's humidity that must not exceed 12%. The rating humidity is 9...12%:
NOTE: For soybeans humidity less then 10% we recommend an outlet plug with 9 mm diameter, and 8 mm for humidity 10...12%
8.4.5. Other ratings specifying the product quality are evaluated in a lab via the special techniques.

9. Maintenance

9.1. Exact observance of rules and regulations concerning maintenance and servicing will provide the constant due operation of the extruder.
9.2. There are the following types of maintenance for the extruder. Daily maintenance (DM), weekly (M1), every three months (M2) and every six months (M3).
9.3. The following maintenance (DM) is to be done before each shift:
1)check up tightening of the thermometer connection on the outlet device's case, as well as that of nuts, locks and connection of the screw part to the rotor's case.

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1)check up if there are any foreign objects on the magnetic catcher's surface.
2)examine the outlet device's opening.
3)There should not be any rests of mixture or foreign objects in the openings;
4)check up the working order and availability of instruments;
5)the electrician on duty must check up the extruder's earth and bonding wires' reliability;
6)check up oil in the rotor and lubrication in bearings.
7)Check up pressure in the water supply.
9.4.Weekly maintenance (M1):
1)Check up tension of the driving actuator's belts. Belt sag must not exceed 10'' mm at the load of 40N (4Kg-force);
2)Disassemble the screw part. Use removers to dismount barrels and screws if necessary;
3)When screws are worn-out at one end - a turn in its middle part is less than 6 mm turn over the corresponding part thus that the non-worn end is turned forward the product's movement. Replace the screw when its both ends
are worn-out.
4)Replace 1 mm worn-out nuts or if any cracks or nicks are noticed on them;
5)Replace sleeves when their ridges within 30 mm of their length are worn-out for the 2..3 mm depth,;
6)Assemble the screw part and check up bolts tightening in the units' fastening;
7)Do all proper DM works.

9.5. Every three months (M2):
1)Remove the protective shroud and check up the pulleys' fastening;
2)Check up the pulleys' positioning regard to each other the edges are to be situated in the same surface (displacement must not exceed 2mm);
3)Check up the belts' tension;
4)Check up tightening of all bolts;
5)The electrician on duty must check up the earth and examine the electrical equipment;
6)Do all proper M1 works.

9.6. Every six months (M3):
1)Replace oil in the rotor. Transmission oil 80W90. Oil level corresponds the rotor's axle.
2)Disassemble the driven pulley and the cover, replace lubrication in the bearing 14 (Litol-24 GOST21150-87);
3)Do all proper M2 works.

Note: Do not use the same seal rings after the rotor's dismounting. Control the radial clearance in the bearing 52 with the nut 55. Maintenance of the electric motor and motor-reducer is to be done following the correspondent manuals.

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10. Trouble Shooting and Fault Removal

Troubles, defect manifestation and additional symptoms	Probable cause	Fault removal
1. The extruder does not run at its normal output.	1. High dockage in the initial grain. 2. Drive's actuator's belts are weakened.	Change the initial grain for the graded one. Adjust the belts' tension moving the driving actuator's motor.
2. The receiving cone is overfilled, the product does not discharge out, the drive's actuator's motor load drops, evaporations from the cone.	1. The screw part's channel is clogged up. 2. Turns close to washers are worn-out. 3. Sleeve ridges are worn-out. 4. High dockage in the initial grain.	Clean the screw part's channel. Turn screws over thus that the non-worn end results turned forward the washer; replace the screw when its both ends are worn-out. Replace sleeves. Change the initial grain for the graded one.
3. The process temperature is lower than normal.	1. The output is over-estimated. 2. The opening diameter of the outlet plug is excessive. 3. The initial grain's humidity exceeds 16% 4. Washers are worn-out for more than 1 mm in diameter.	Reduce the output. Replace the outlet plug for one of less diameter. Change the initial grain for the graded one. Replace washers.
4. Grain does not proceed to the receiving cone	1. There is an arch formed in the hopper.	Knock slightly at the bowl until the arch disappears. Open the hopper's gate.
5. Strong oscillation of the meter needle of the main driving actuator's motor load	1. High dockage in the initial grain.	Change the initial grain for the graded one.
6. The drive'sactuator's motor fails to switch on, the circuit breaker actuates.	1. The set value on the digital ammeter is less than nominal. 2. A closure happened in the power circuits. 3. The driving actuator's motor is faulty.	Set the delay period on the digital ammeter. Remove the closure. Repair or replace the driving actuator's motor.

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7. The process temperature exceeds the normal, there is no extrusion	Low humidity of the initial grain	Change the initial grain for the graded one.
8. Oil in the rotor is overheated, more than 353 K	**1.** The bearing 52 is tightened (fig.2) **2.** Oil make does not meet 80W90	**1.** Loose the bearing's tightening **2.** Replace oil
Bearings 53 are overheated (fig. 2)	Deficient lubrication	Fill the bearing with lubricant

11. Transportation and Storage

11.1. Extruder is supplied in or without package via railway, motor vehicle, river and sea transport, if all rules and requirements of this or another transport are kept.

11.2. Terms of this device's transportation to the moderate and cold zones regarding climatic conditions belongs to the storage conditions group 8 (ОЖ3), GOST 15150, for sea transportation - group 8 (ОЖИ), GOST15150.

11.3. Storage conditions 2 (С) GOST15150.

11.4. Conservation is purposed to provide the extruder's safety for 18 months at least after delivery to the customer, and for 30 months for spare parts. If the customer intends to store the extruder and spare parts for more than the said period he must re-conserve them himself in accordance with regulations GOST 9.014.

11.5. If the customer violates transportation, storage and re-conservation rules the manufacturer does not guarantee the extruder's safety.

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12.Acceptance Certificate

The extruder E-1000, serial number 177 has been manufactures and accepted in accordance with requirements of state standards and technical documents, it is certified for operation.

Seal(Signature) ВТК-12 ОТК-1 Chief of the Inspection Department Томак Н.В.

On (date)

13. Manufacturer's Warranty

13.1. The Manufacturer guarantees that the extruder meets all requirements if the customer keeps all conditions of transportation, storage, mounting, adjusting and operation.

13.2. The warranty period is 12 months (2000 hours) since putting into operation, but not more than 18 months since the moment the customer has received this item. The warranty period for wearing parts is 400 hours.

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Wearing Parts

Supplement 1

1. Washer E-1000.00.00.009	(pos. 14, fig.4)
2. Washer E-1000.00.00.008	(pos. 15, fig.4)
3. Screw E-1000.01.00.012	(pos. 13, fig.4)
4. Screw E-1000.00.00.013	(pos. 12, fig.4)
5. Sleeve E-1000.00.00.038	(pos. 23, fig.4)
7. Sleeve E-1000.00.00.033	(pos. 51, fig.4)
8. Plug E-1000.00.00.005	(pos. 25, fig.4)
9. Plug E-1000.00.00.005-01	(pos. 25, fig.4)
10. Plug E-1000.00.00.005-02	(pos. 40, fig.5)
11. Washer E-1000.00.00.008-01	(pos. 38, fig.5)
12. Washer E-1000.00.00.010-01	(pos. 39, fig.5)
13. Screw E-1000.30.00.003	(pos. 37, fig.5)
14. Washer E-1000.00.00.010	(pos. 16, fig. 4)
15. Nozzle E-1000.00.00.006	(pos. 17, fig. 4)
16. Plug E-1000.00.00.011	(pos. 33, fig. 4)
17. Plug E-1000.00.00.030	(pos. 32, fig. 4)

Bearings Set

Supplement 2

-9039420 GOST 9942-90- 1 piece	Pos. 52 (fig. 2)
-13518 GOST 8545-75- 1 piece	Pos. 53 (fig.2)
-1320 GOST 7520-75- 1 piece	Pos. 54 (fig.2)
-1206 GOST 28428-90- 1 piece	Pos. 68 (fig.6)
-7208 GOST 27365-87- 2 pieces	Pos. 67 (fig.6)

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Supplement 3 General Mechanical Rubber Goods

Rings GOST 9833-73	
1. Pos. 61 098-105-46-2-5	1 pc
2. Pos. 62 100-108-46-2-5	1pc
3. Pos. 64 205-215-58-2-5	2 pcs
Sleeve gaskets GOST 8752-70	
5. Pos. 65 1-105X130-4	1 pc
6. Pos. 66 1-120X150-4	4 pcs
7. Driving wedge belt UV-3550 TU38.105.1998-91	8 pcs

Figure 1	
Русский	**English**
с отсекателем	with cutting device
без отсекателя	without cutting device
Figure 4	
Зерновая наладка	Adjusting for grain
Figure 5	
Соевая наладка	Adjusting for soybeans
Figure 7	
Откл.	Off
Вкл.	On
Напряжение,	Voltage
Температура	Temperature
частота, Гц	Frequency, Hz
ток привода I=164A	Driving actuator's current I=164A
подача зерна	grain supply
стоп	stop
пуск	start
экструдер пуск / стоп	extruder start / stop
отсекатель пуск / стоп	cutting device start / stop
питатель пуск / стоп	feeder start / stop

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Figure 8	
Русский	**English**
Эл. двигатель	Electric motor
цифровой амперметр	Digital ammeter
шунт	shunt
Эл. двигатель отсекателя	Cutting device's electric motor
Наличие фазы	Phase availability
Наличие напряжения	Voltage availability
Реле включения	Shutdown relay
Пускатель экструдера	Extruder actuator
Пускатель отсекателя	Cutting device actuator
Пускатель питателя	Feeder's actuator
Измеритель-регулятор температуры	Temperature control unit
Термопреобразователь сопротивления	Resistance thermoelement

Figure 9

1.Take of the exterior lock 4, outlet barrel 2 with a plug 1, nozzle 3.
2.Remove rests of the processed products from the taken off parts.

Barrels 5 dismounting
1.Install the ring 6 instead of the outlet barrel 2 and fix with the lock 4.
2.Install the washer 7, screw the nozzle of the puller 8 on the shaft 9.
3.Thread the chain 10 into slots of the puller's base 8 and the ring 6. Fix with a pin 13
4.Lift the ring 6 with a jack and remove the first barrel dismounting a "spare" screw first.

Screws 11 dismounting
1.Screw the ring 12 on the exterior screw 11.
2.Screw the nozzle of the puller 8 on the shaft 9.
3.Thread the chain 10 into slots of the puller's base and the ring 12, fix with a pin.
4.Lift the puller with a jack and remove the first screw.
5.Take off the next screw moving the ring 12, dismounting the next barrel first.

(left-hand thread)

Figure 10	
Русский	**English**
схема строповки экструдер	Extruder's strapping diagram
Центр тяжести	Center of gravity

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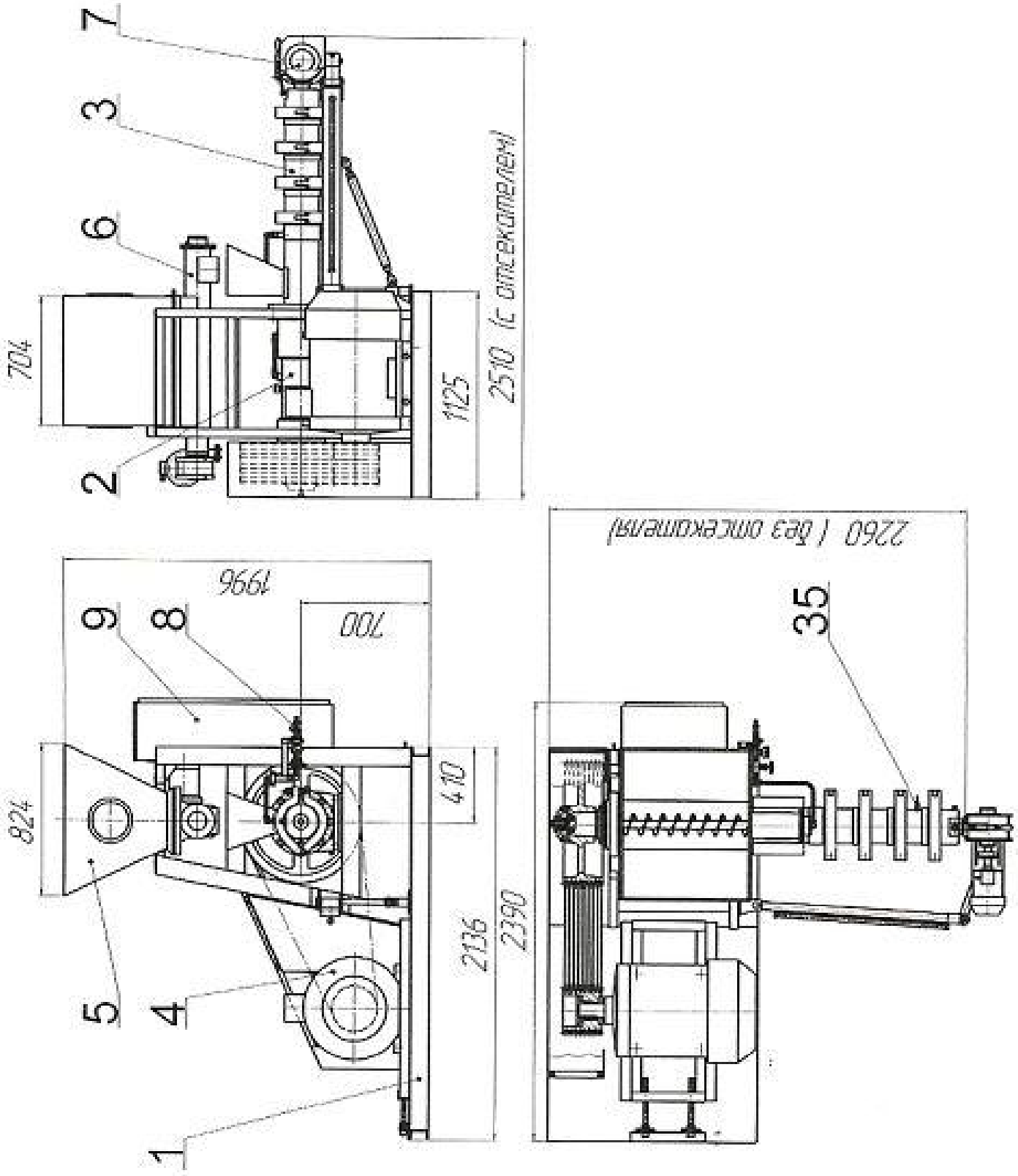

Figure 1

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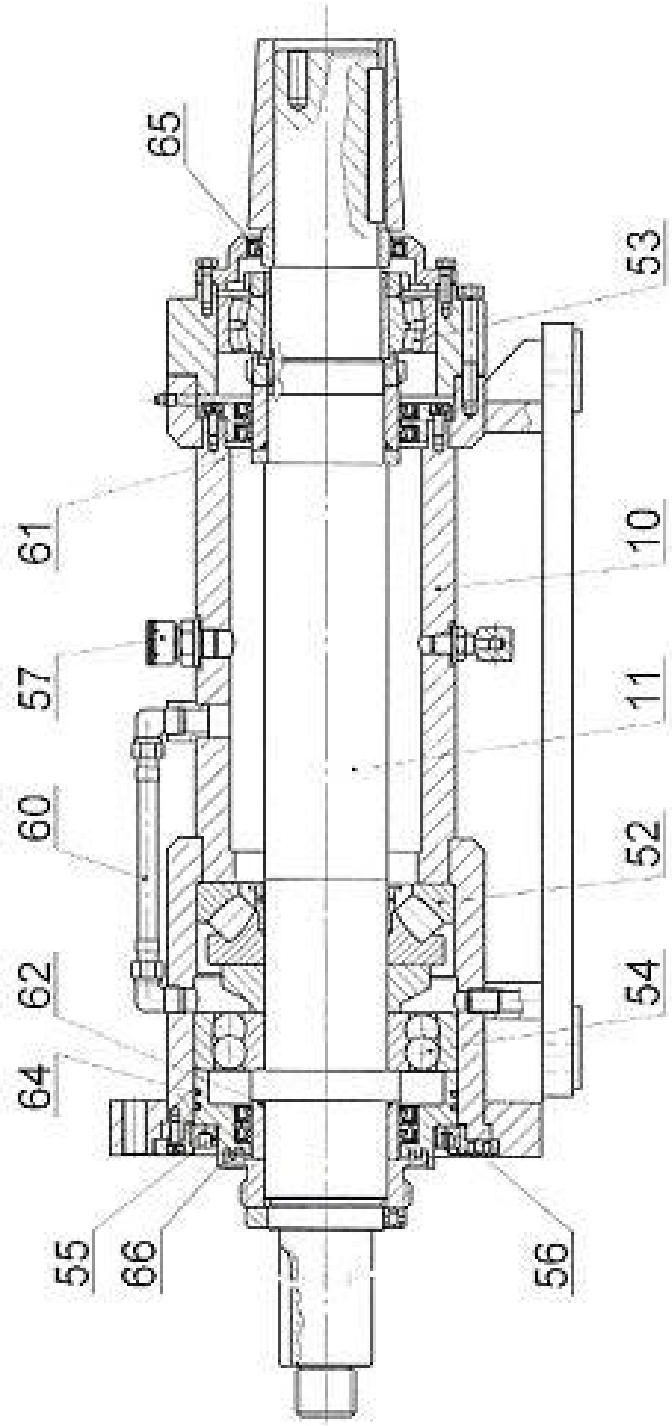

Figure 2

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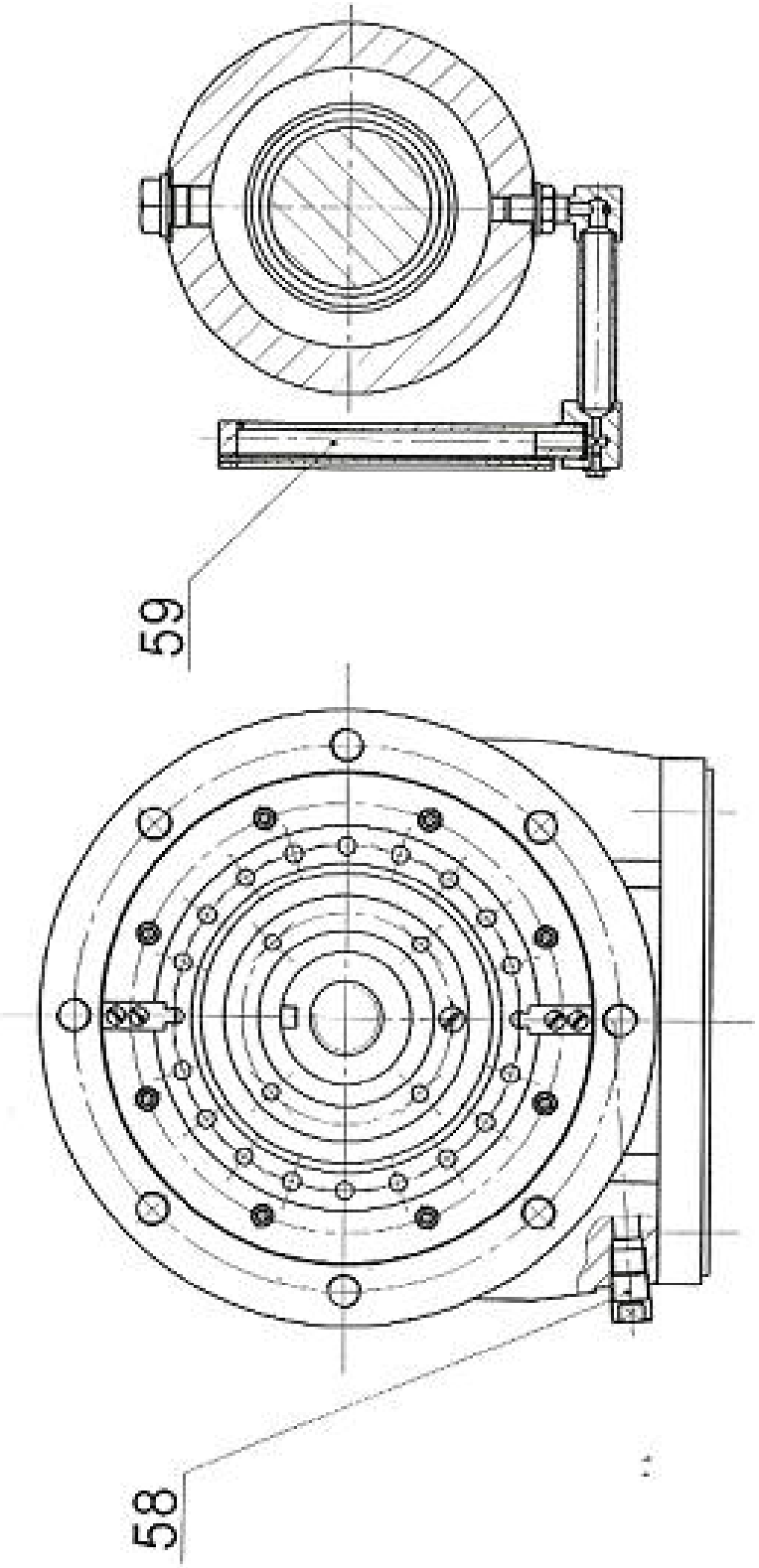

Figure 3

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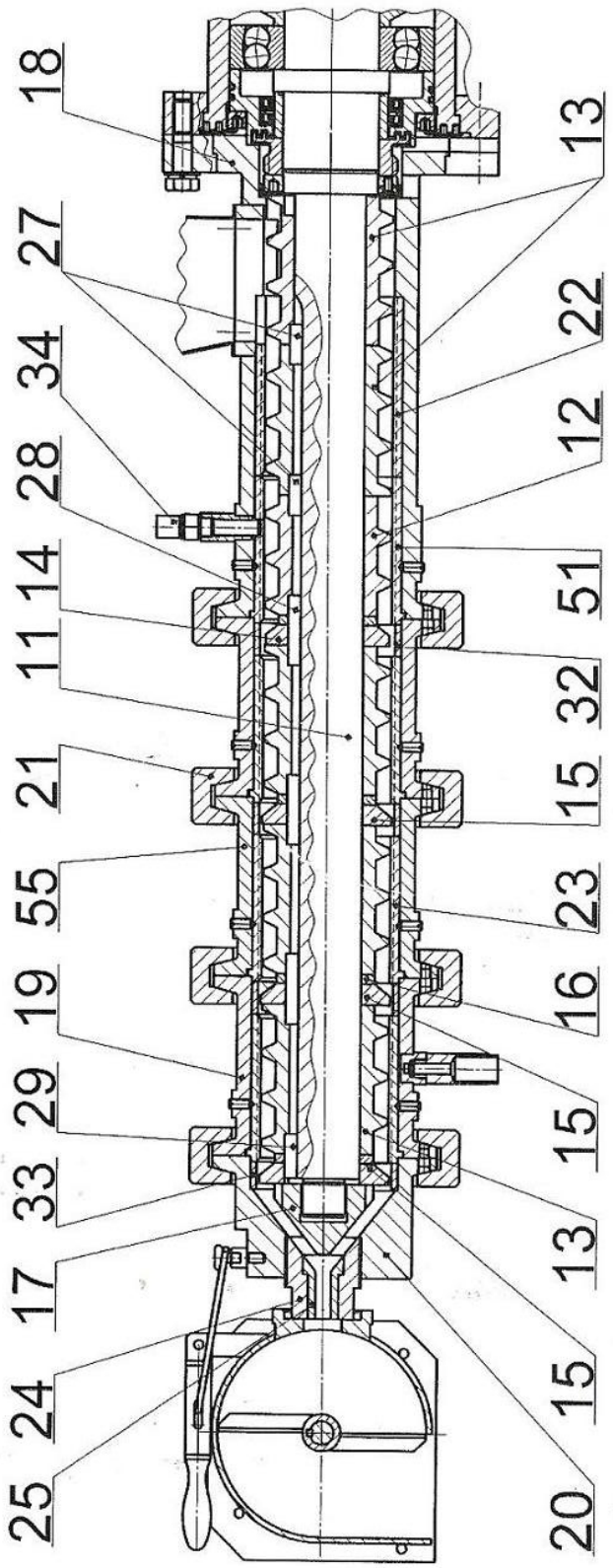

Screw part adjusted for grain

Figure 4

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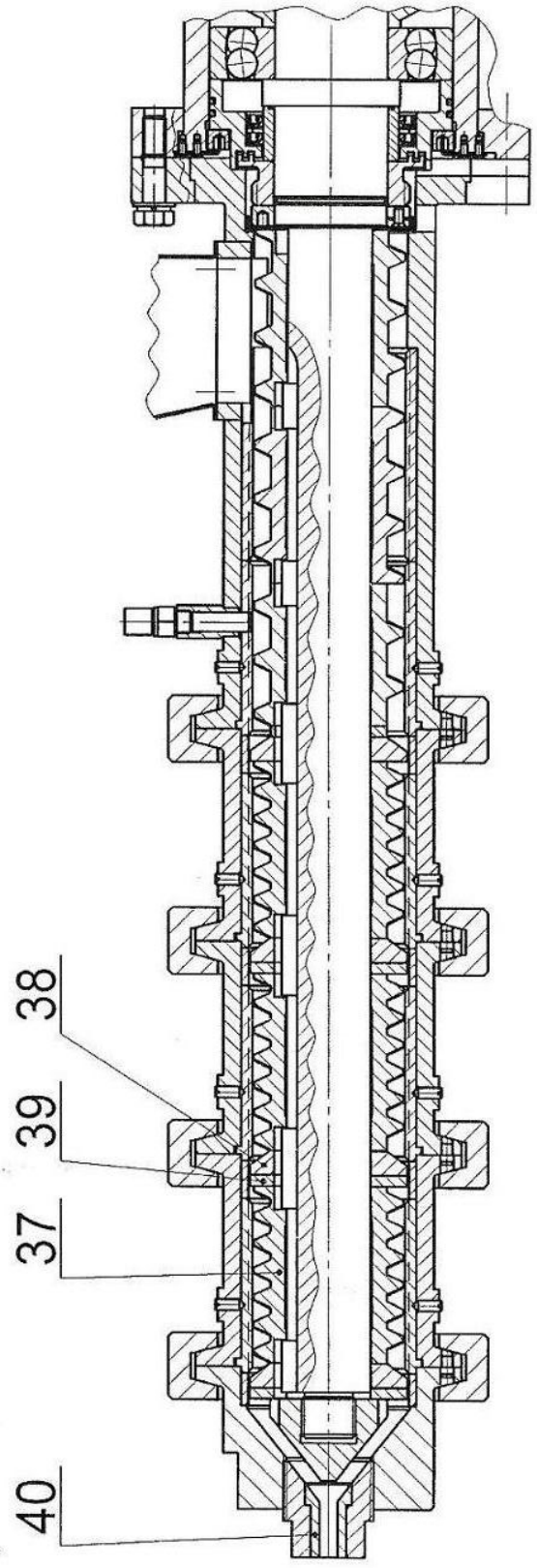

Screw part adjusted for soybean

Figure 5

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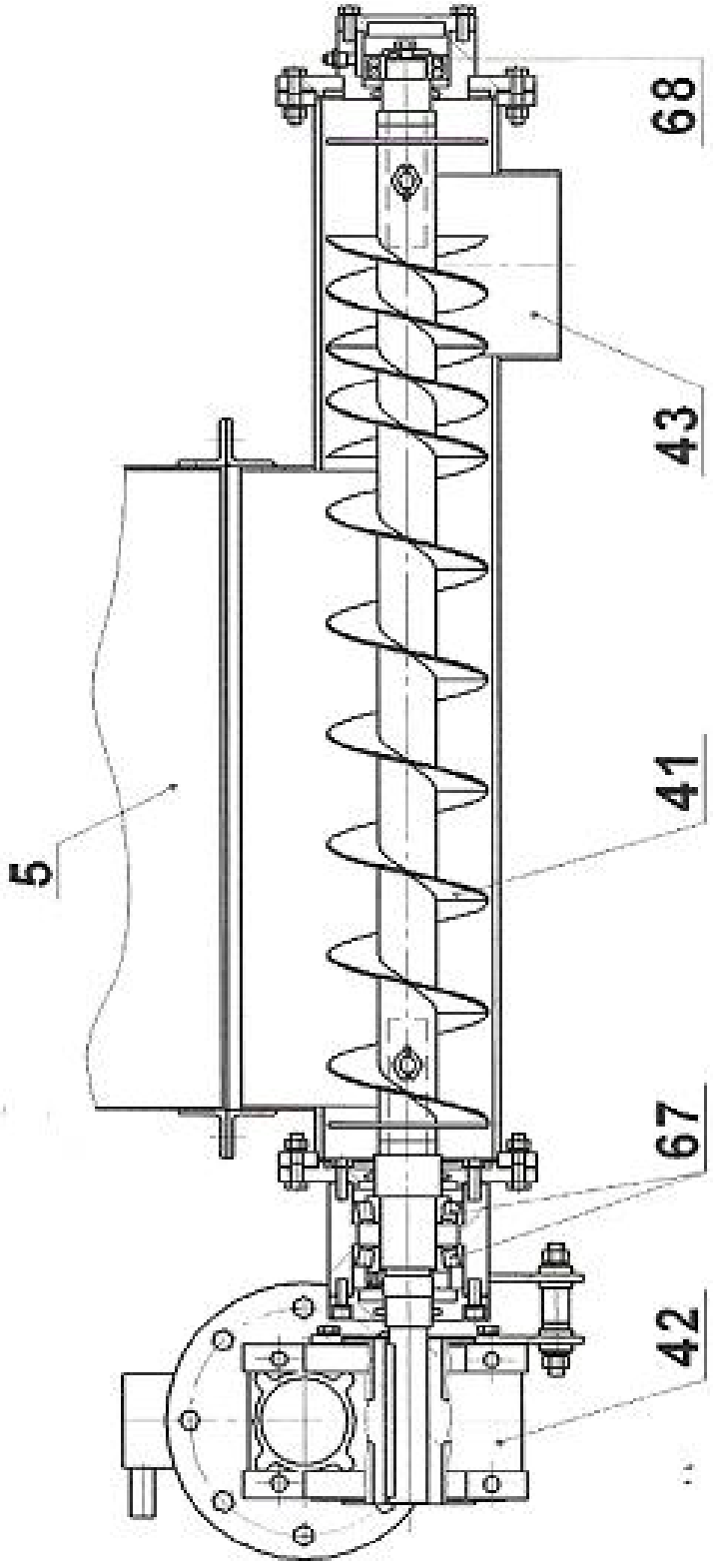

Figure 6

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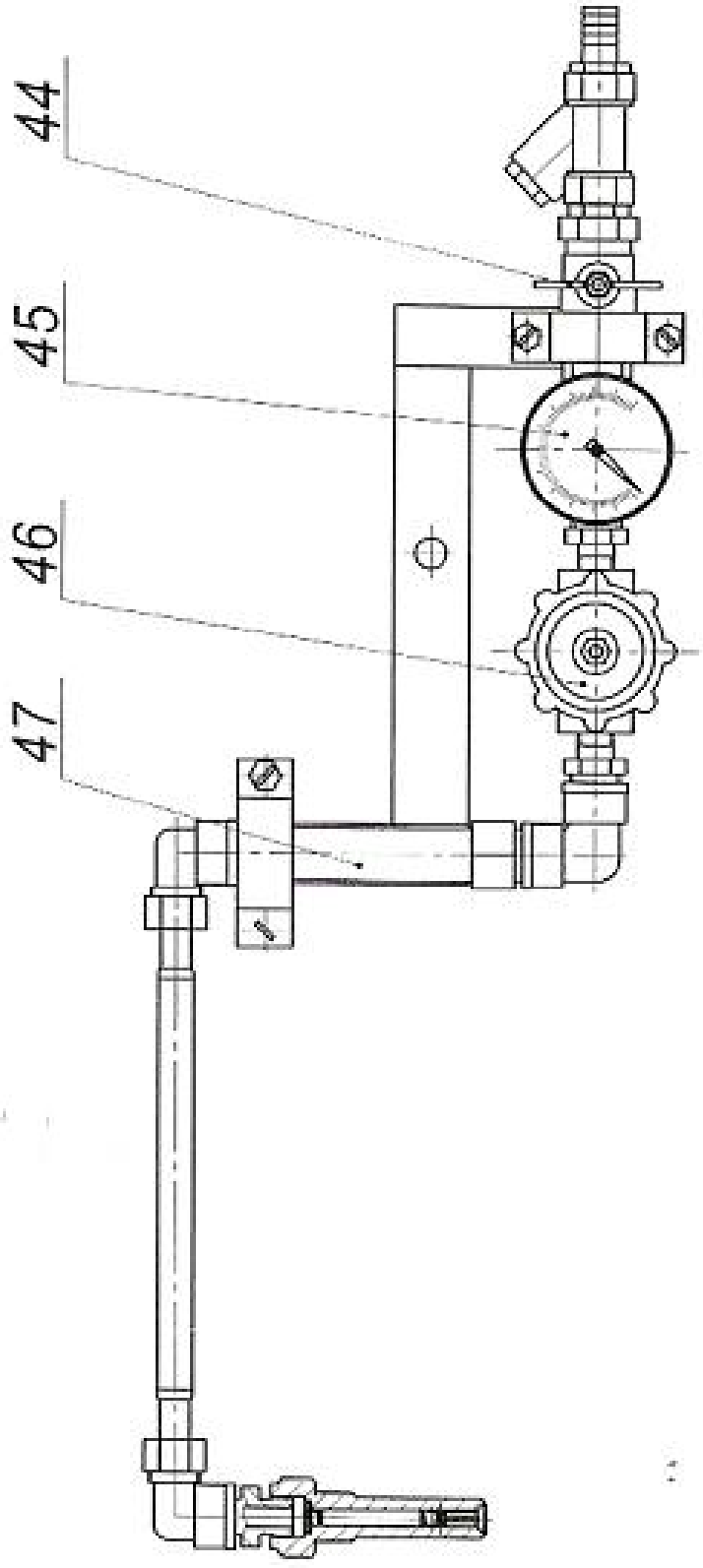

Figure 7

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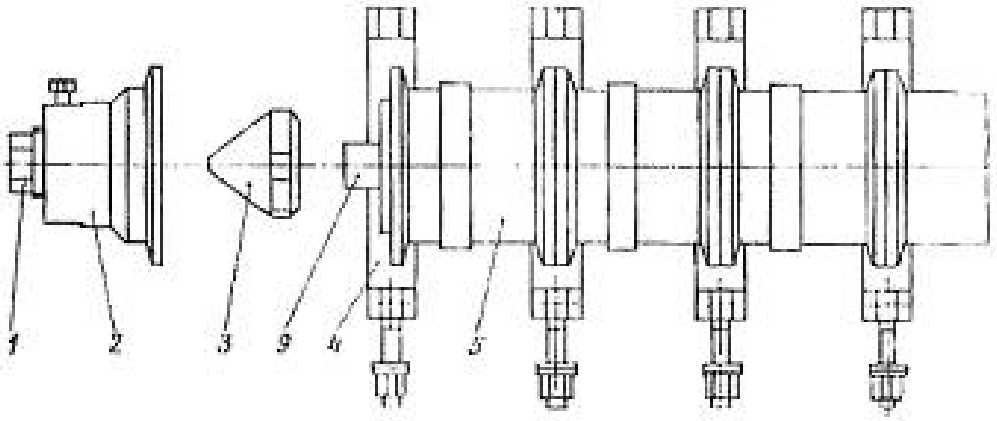
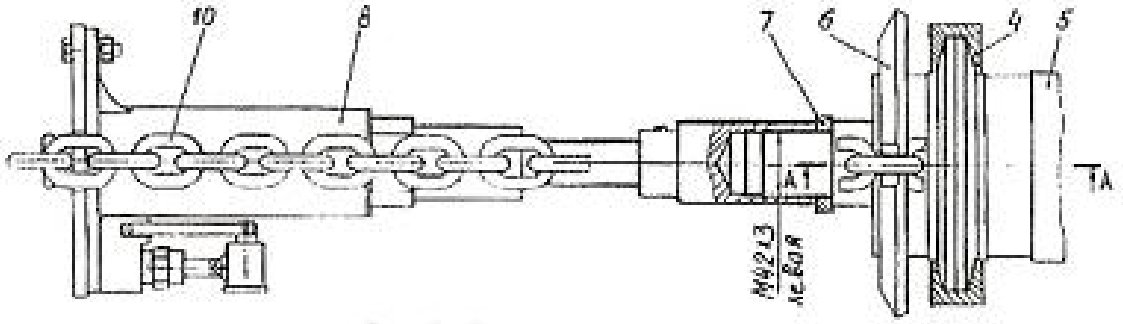


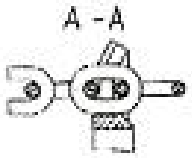
1.Take of the exterior clock 4, outlet barrel 2 with a plug 1, tip 3.

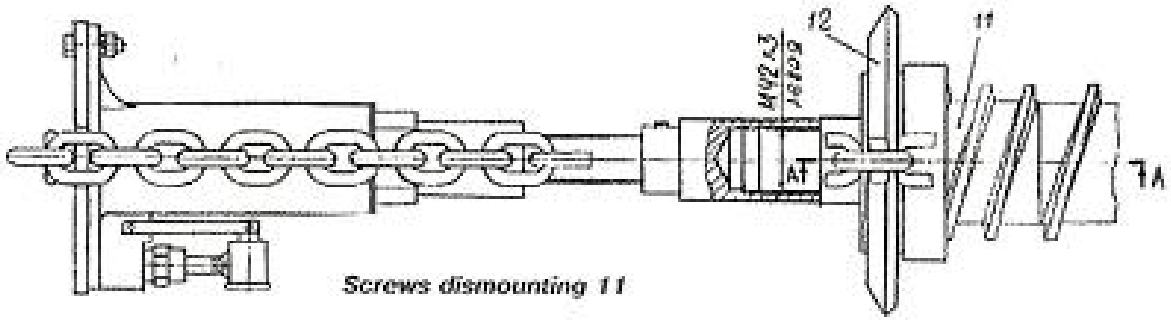
2.Remove rests of the processed products from the taken off parts.



Barrels dismounting in 5

1.Install the ring 6 instead of the outlet barrel 2 and fix with the lock 4.
2.Install the washer 7, screw the tip of the puller 8 on the shaft 9.
3.Thread the chain 10 into slots of the puller's base 8 and the ring 6.
Thread the chain into slots of the ring 6 as shown on the figure A-A.
4.Lift the puller with a jack and remove the first barrel.
5.Take off other barrels moving the ring 6.





Screws dismounting 11

1.Screw the ring 12 on the exterior screw 11.
2.Screw the tip of the puller 8 on the shaft 9.
3.Thread the chain 10 into slots of the puller's base and the ring 12.
4.Lift the puller with a jack and remove the first screw.
5.Take off other screws moving the ring 12.

Figure 10

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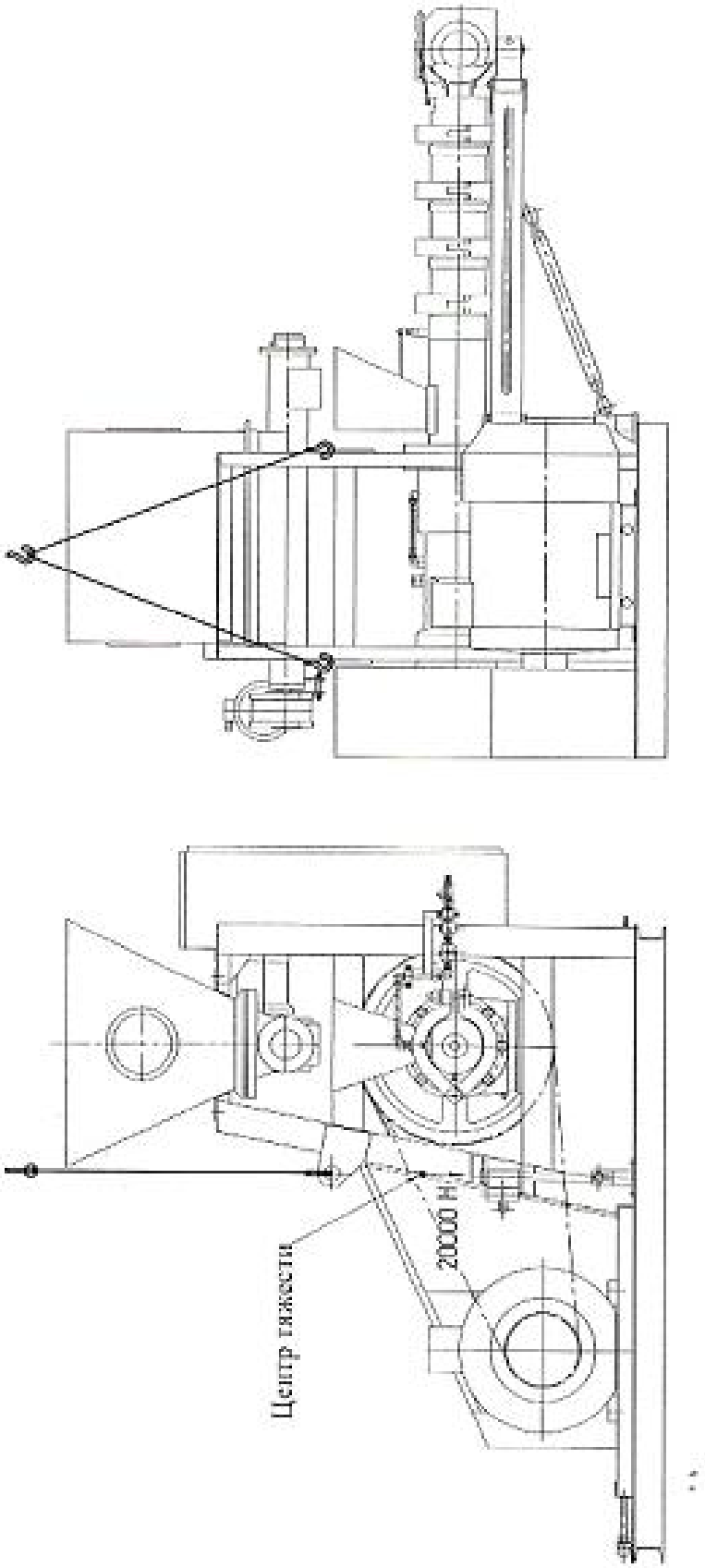

Extruder's strapping diagram

Figure 11

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