

ZBJ Press

Operation Manual

ZJB—50 Stick fuel forming machine

I. Use and features

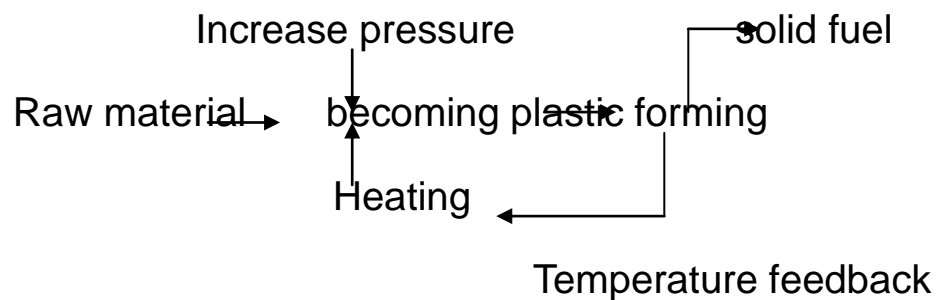
This machine is made up of the heating collar,propeller,forming cylindar,inner wear sleeve thermocouple,body and the stand and it is use to make stick solid fuel with sawdust, rice shell or peanuts shell, and other crushed biomass(without any additive) under high pressure.

This machine adopts temperature adjusting indicator, it can work steadily at the fixed temperature and has the feature of rational structure, being easy to operate and maintain. The solid fuel produced by this machine has the feature of being easy to light, and having high calorific value (over 20% higher than normal wood), little pollution when burning and high density which is favorable to transportation. This machine can make full use of the remainder

of farm and forest, and solve the problem of farm and forest resource being in short supply in our country.

II. Working basis

Using the intrinsic attributes of wood material, by spiral extruding at high temperature, under high pressure, wood element in wood material becomes plastic and makes the fine fiber combine, and then stick solid fuel is formed.



Work basis frame picture

III Main technical parameters and features

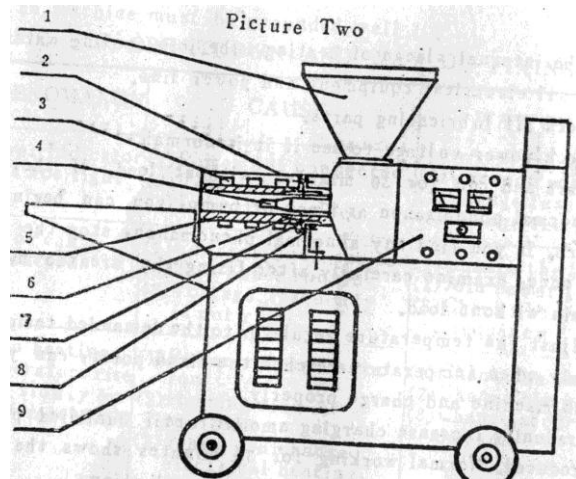
- 1 Motor power:
Heat power:
2. Productive ability:
- 3 Electricity consumption:
- 4 Size: L/W/H=mm
5. Weight: kg
- 6 Demand on material:
 - (1) Water proportion: 8---12 %(wet base)
 - (2) Size: ≤2-5mm
- 7 Product feature:
 - (1) External form size: external diameter ♀mm
Internal diameter ♀mm
Length >50mm
 - (2) Specific gravity: 1200—1300kg/m³
 - (3) Calorific value: 4400—5000kcal/kg

IV Structure sketch (refer to picture 2)

- 1 Charging hopper
- 2 Heat insulation cover

- | | |
|---------------------------|-----------------|
| 3 Heating collar | 4 Propeller |
| 5 Heating tube | 6 Taper sleeves |
| 7 Stand internal sleeve | 8 Stand |
| 9 Electric control boards | |

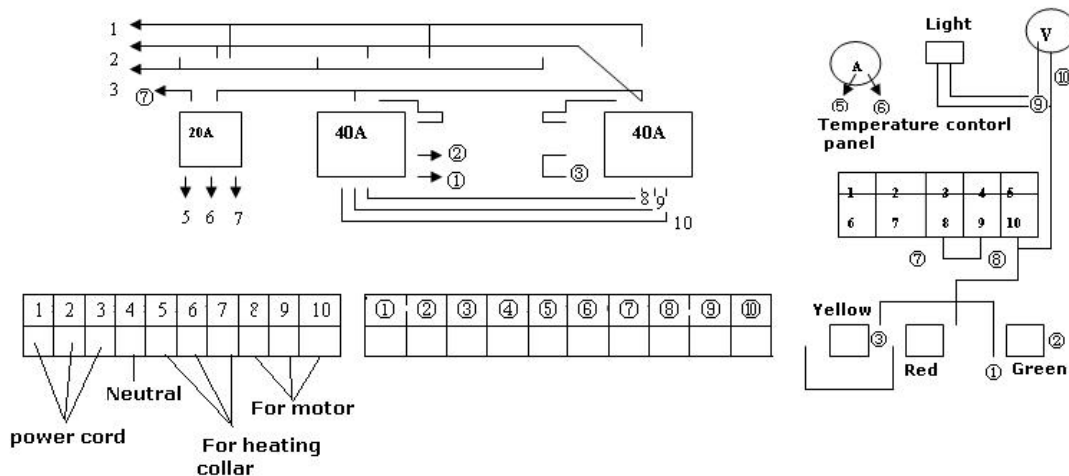
Picture two



V Installation and test

1. Tighten all binder bolts, esp., and the three withstanding screws in the internal sleeve of heating tube and all electrical equipment and power line.(see the electric disgram)
2. Check all lubricating parts.
3. Check power voltages to see if it is normal.
4. Start and run for 30 minutes without load. If there is no abnormal phenomenon as block or bump, you can begin normal work. If you find any abnormal phenomenon, stop the machine at once, examine carefully, after fixing the breakdown, run it again without load.
5. Adjust the temperature regulator to the demanded temperature. Only when temperature reaches the fixed point, can you start the machine and charge properly.
6. Gradually increase charging amount until qualified product is produced. Normal working for 30 minutes shows the test has succeeded, and then you can go into normal production.
7. Before stopping the machine, empty the charging hopper, and run it reversely for one minute to make the material in propeller come out.
- 8 The machine must be grounded well.

Circuit Diagram



VI Cause for breakdown and way of fixing

| No | Phenomenon | Cause | Way of fixing |
|----|---|--|--|
| 1 | Power indicator doesn't light. | (1) Power not connected. (2) Fuse is spoiled. (3) Indicator spoiled. | (1) Connect power line. (2) Change fuse. (3) Change the indicator. |
| 2 | Motor can't be started. | (1) Control knob spoiled. (2) Two phase running. (3) Voltage, frequency is not right. | (1) Change the knob. (2) Join power line well. (3) Check the voltage and frequency. |
| 3 | When heating, temperature rise very slow or can't reach 350°C | (1) Power voltage is too low. (2) Heating ring is spoiled. (3) When you change electrical heating line of the heating ring, line of wrong type was used. | (1) Check the voltage. (2) Change the heating ring. (3) Change according to the demand. |
| 4 | Motor is hot. | (1) Load is too heavy. (2) Two-phase running. (3) Bearing is spoiled. (4) Wind path is blocked (5) Circumstance temperature is too high. (6) The voltage is too high or too low. (7) Short circuit between stator winding or phases. | (1) Check according No .5. (2) Check fuse, switch, contact point, fix the breakdown. (3) Change the bearing. (4) Clear the path. (5) Decrease the temperature. (6) Adjust the voltage. (7) Check and fix the |

| | | | |
|---|----------------------------------|---|--|
| | | | breakdown. |
| 5 | Stick can't be produced. | <ul style="list-style-type: none"> (1) Material is too wet. (2) Heating temperature is too low. (3) Spiral groove is blocked. (4) The groove in the internal sleeve of heating tube and the groove in heating sleeve are in relatively wrong place. (5) Voltage is too low. (6) Stand internal sleeve is worn. (7) The internal sleeve of heating tube worn. (8) Propeller is worn. | <ul style="list-style-type: none"> (1) Dry the material. (2) Raise the temperature. (3) Grind propeller and remove obstacle. (4) Install the internal sleeve of heating tube again. (5) Check the voltage. (6) Change the internal sleeve. (7) Change the internal sleeve. (8) Grind the propeller. |
| 6 | Sticks can't be formed. | <ul style="list-style-type: none"> (1) Material is too wet. (2) The spiral groove in the internal sleeve of heating tube and that in heating sleeve is relatively not in right place. (3) Temperature is too high. (4) The front angle of the propeller is less than 20°C. (5) Thermal couple is fixed in wrong place or not properly. (6) Heating ring is in short circuit. (7) Too much oil in the material. | <ul style="list-style-type: none"> (1) Dry the machine. (2) Install the internal sleeve of heating tube again. (3) Decrease the temperature. (4) Grind the front angle. (5) Fix the thermal couple well. (6) Check the circuit of the heating ring. (7) Improve the front angle of the propeller(refer to appendix 2) |
| 7 | Steam comes out from the hopper. | <ul style="list-style-type: none"> (1) Material too wet. (2) Stand internal sleeve is badly worn. (3) Internal sleeve of heating tube is badly worn. (4) Spiral front angle of the propeller doesn't accord with the demands. | <ul style="list-style-type: none"> (1) Dry the material. (2) Repair the sleeve. (3) Repair the sleeve. (4) Grind the propeller. |

VII Cautions:

1. Before starting the machine, turn the belt pulley manually to see if it is blocked.
2. Before starting the machine, tighten the bind bolts on the heating tube esp., the three

withstanding screws.

3. Before stopping the machine after continuous work, empty the hopper first, and run it reversely for one minute, then the machine can be stopped.
4. When work begin again, the machine can't be started before the temperature of heating tube rises to 350°C; charge a little first, after stick is produced, you can charge at large quantity.
5. When working, pay attention to the voltage and the electricity current to see if they are normal to avoid motor damage.
6. When the propeller can't rotate, stop the machine at once, run it reversely, clear the material in the hopper, and raise temperature again. After the temperature is 20°C higher, start the machine again and follow the above proper steps.
7. The product outlet should be pointed to a wall and a plank should be put in front of it against wall.
8. When you begin to work, no person should stand in front of the outlet.
9. Electric circuits should be kept dry and clean, after stopping the machine, power must be turned off.
10. Stone and iron chips are strictly forbidden to get into hopper. As soon as any abnormal phenomenon appears stop the machine at once.
11. All lubricating parts must be oiled every two months.
12. It is forbidden to start the machine without the machine being well grounded.

TECHNOLOGY OF REPAIRING PROPELLER

After working for 24 hours, propeller should be checked, if it is worn, it should be taken down and repaired.

When any of the following conditions appears, it needs to repair the propeller.

1. The speed of producing sticks has obviously decreased.
2. The humidity of the material and temperature both accord with demands, but the machine is often blocked, and normal production can't go on.
3. Sticks can be formed, but are separated into several lengths, and can't be joined together.
4. Sticks can be produced very quickly, but the structure is very loose, the density is too low.
5. The front point part of propeller is worn less than 4mm.
6. The internal diameter of the product sticks is less than 15mm.
7. Because of stone, nail, or other objects going into propeller or other reason, the spiral part of the propeller is worn.

REPAIRING PROPELLER

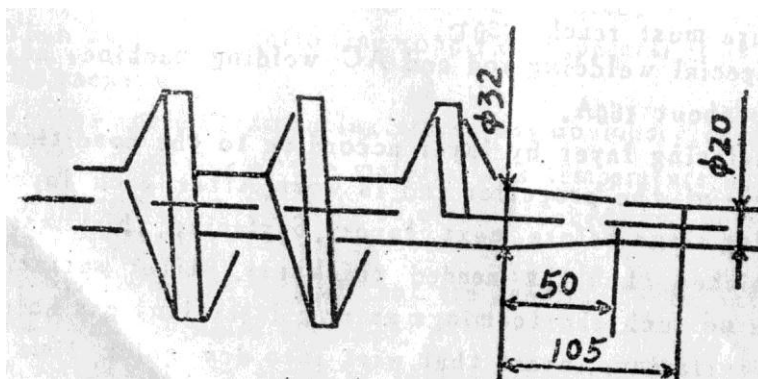
1. Preheat the end part of the propeller which needs surfacing temperature must reach 350°C.
2. Use special welding rod and AC welding machine, adjust electricity to about 150A.
3. Do surfacing by layer according to the condition that the front angle of the propeller end is

worn. When each layer is finished remove the welding slags then come to next layer. Surfacing thickness must be 1—2mm thicker than the needed thickness. After surfacing, there should be no such shortcomings as slag insertion, gas holes, etc.

4. After surfacing, insert that part into dry quick line or plant ash to cool, the inserted part must be over three guide screw.

5. When it is cooled to 50 degree or lower, take it out and grind it on green silicon carbide emery wheel. It is forbidden to push suddenly, make some part too hot, or cool with water or other liquid.

6. When you are grinding, the front angle increase at 360 degree circle point from 2 gradually, and must get to 22 degree ± 1.5 degree by the end of it. During the increasing of the front angle in this period, there should be no bumps or hollows, unsmoothness or shortcomings.



7. As is shown in above picture, if the 105mm long circumference of the spindle end is worn more than 6mm, repair according to following technology.

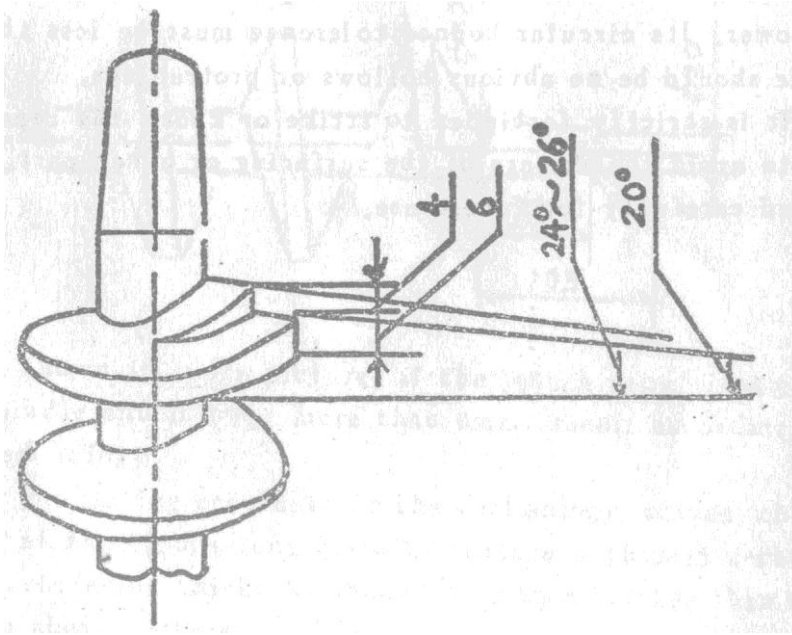
(1) After preheating according to the technology stated above, do surfacing at the 105mm long circular surface with J442 carbon welding rod. Surfacing thickness should be 1—2mm thicker than the size marked in above picture.

(2) Insert it into dry quick lime or plant ash to cool, and grind it according to the size marked in the picture when it is cooled to 50°C or lower. Its circular bounce to tolerance must be less than 2mm, and there should be no obvious hollows or protruding.

8 It is strictly forbidden to strike or knock the repaired propeller to avoid the damage of the surfacing or other part. It should be stored carefully for future use.

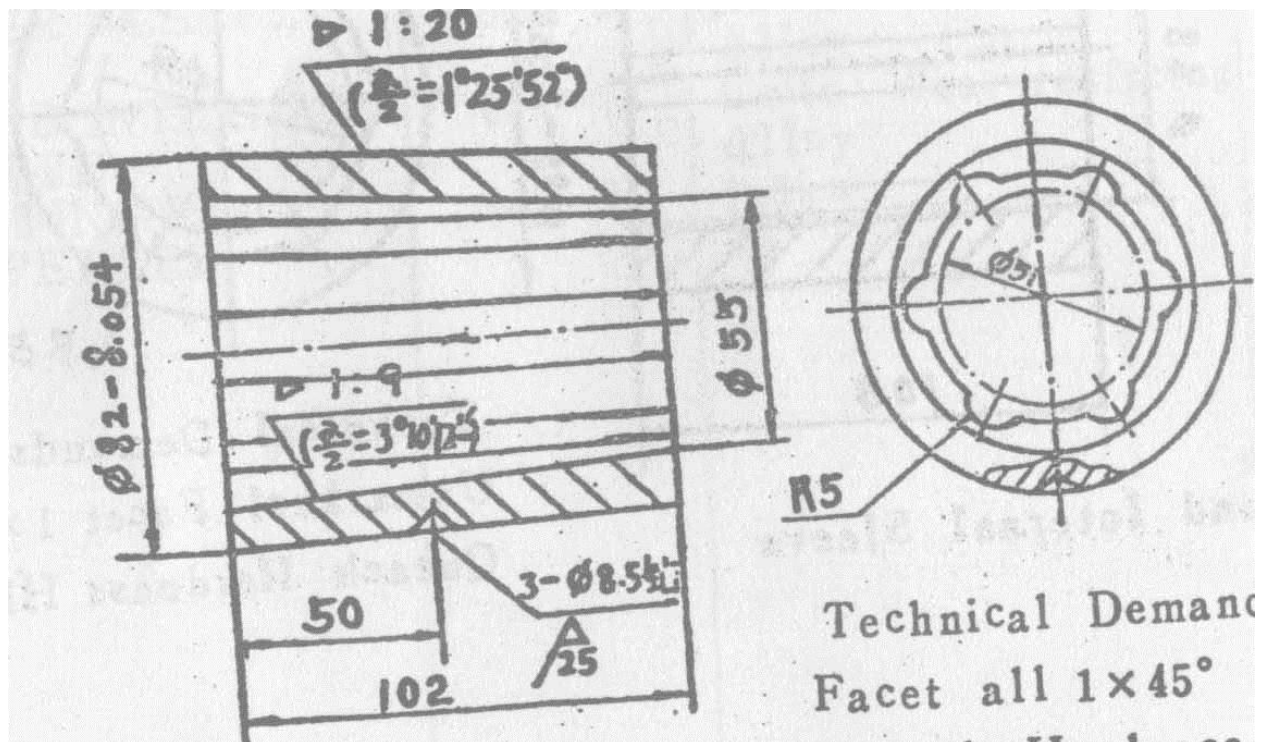
APPENDIX B

Grinding special propeller

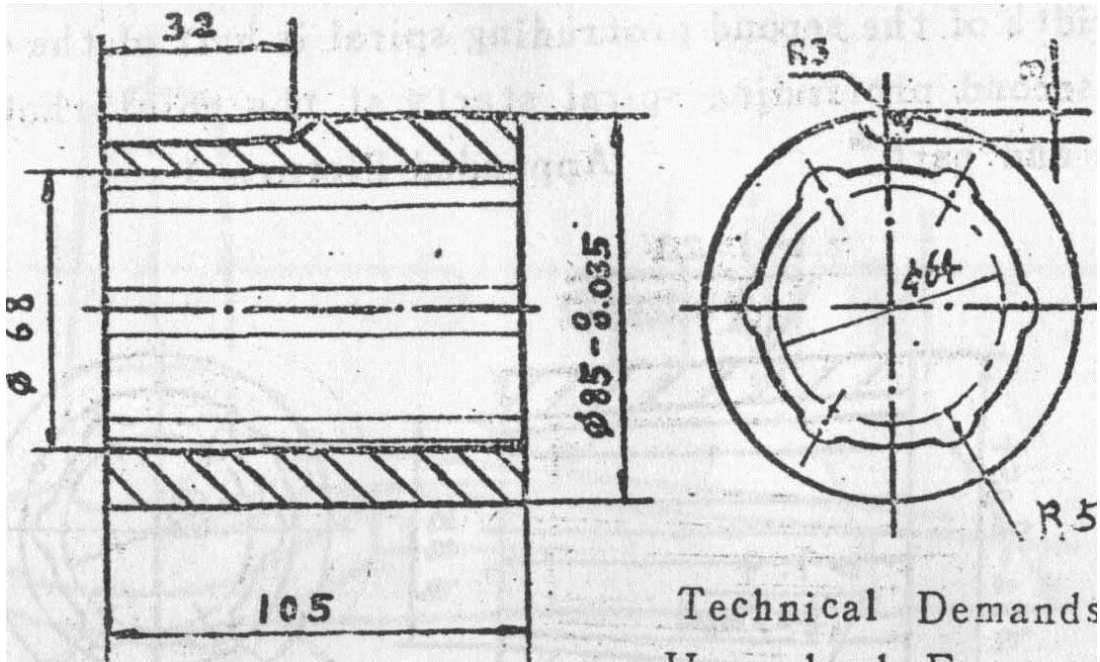


1. Do surfacing as is shown in above picture, as for surfacing technology, refer to appendix A.
2. The width of the second protruding spiral is half of the original width.
3. The second protruding spiral starts at the point that turns 90° from the end part.

Appended Picture 1



Appended Picture 2



Stand Internal Sleeve

Technical Demands

Unmarkec1 Facet 1*45° Quench Hardness HRC57-60

OPTIONAL ACCESSARIES

| No | Name | Parts number | Material | Memo |
|----|-----------------------|--------------|----------------------------|--------------------------------------|
| 1 | Taper sleeve | 005-6 | Cr Mn Wear-resisting Alloy | Repairable Refer to Appendix A |
| 2 | Stand internal sleeve | 005-7 | Cr Mn Wear-resisting Alloy | |
| 3 | Heating ring | 005-9 | 1.5kw | |
| 4 | Propeller | | 45 | |