

Patent

Applied for.

Cost per Unit

Rs 350/-

Specifications

Name	: CRRRI rice chaff and husk stove
Type	: Domestic
Model	: Improved Model
Size	
Diameter (mm)	: 370
Height (mm)	: 430
Weight (kg)	: 2.6
Fuel holding capacity	: 1.2 kg of rice husk.
Fuel consumption	
During trial	: 2 kg of husk/chaff and 160 gm of firewood sticks for one hour burning.

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CRRRI Chaff/Husk Stove



CRRRI Rice Chaff and Husk Stove

R.S. Devnani

In India more than 300 million tonnes of biomass is produced. Most of it is either burnt in the open or used as fuel in rural areas or processed as animal feed. In order to take advantage of the large availability of biomass, the CRRRI has fabricated a rice chaff and husk stove, which is a domestic unit of small size. The stove uses rice chaff and husk as fuel to provide heat energy for cooking. It is a low cost and easy to operate stove with high thermal efficiency. It burns the chaff or husk and other light-weight biomass without producing smoke or interruptions during burning. It is a boon for families in the rural areas where rice chaff or husk is available in plenty. The stove works on the principle of gasification and induced natural air draft.

The CRRRI Stove

The stove consists of an outer container with a conical hopper top made of mild steel sheet, which is attached to the cylindrical bottom portion of perforated sheet. In the centre there is an inner cylinder of perforated sheet with holes of 3 mm diameter. This acts as the combustion chamber. The hopper and combustion chamber are placed on the top of grate made of perforated sheet, which is pivoted at the centre of the inner cylinder. On the top of the hopper a grill is placed to hold the pot for cooking.

The rice chaff/husk that is used as fuel is filled in-between the space of the outer container and the inner cylinder. A 25 mm diameter port at the base of the combustion chamber is provided to combustion chamber to place a burning stick in for initial burning and to avoid reigniting if the flame is extinguished. The port is made of perforated sheet.

The stove is mounted on the tripod for free movement of air. The grate is provided with a handle to rotate it slightly for removing ash. The stove has a capacity to hold 1.2 to 1.5 kg of rice chaff or husk for atleast one hour of operation. A higher quantity of chaff / husk can be added to increase the operation time of the stove. To ensure efficient and continuous operation of the stove a firewood stick 25 mm in diameter and about 300 mm in length is placed at the bottom port of the combustion chamber.

Advantages

- ❖ No smoke.
- ❖ No interruption.
- ❖ Efficient burning.
- ❖ Simmering action provided for cooking in low heat.
- ❖ Can also use saw dust and other light weight biomass.
- ❖ Saves firewood and prevents environmental pollution.
- ❖ The ash produced can be used in the rice nursery by mixing it with the soil or for cleaning utensils.

How to Use the Stove

To use the stove following procedure should be followed:

- ❖ Fill the rice chaff or husk in the outer cylinder up to the top. But maintain a clearance of 30 mm to 50 mm below the upper edge of the container.
- ❖ Take the wooden stick, wrap cotton waste at one end of it, and soak it in kerosene. Light it and insert inside the stove from the bottom port.
- ❖ The flame will rise in the inner cylinder of the stove and be visible at the top.

❖ The golden colour of the flame will increase as the temperature of the rice chaff or husk rises and as gasification starts.

❖ The flame will cover the inner cylinder. The flow of combustible gases will be visible in the form of flames coming out of the perforations.

❖ As the gases burn completely, the colour of the flame changes to blue-red. This flame indicates the proper burning of the fuel and its optimum functioning.

❖ Place the cooking vessel with rice and required amount of water on top of the stove for cooking.

❖ Cover the cooking container with lid.

❖ In case visibility of the flame goes down push the wooden stick in the bottom port so that it keeps burning.

❖ Add rice chaff or husk from the top as and when required to maintain a proper flame.

❖ Check the rice when it is being cooked so that it does not get over cooked.

❖ When the rice is nearly cooked, further cooking can be done in low heat. This can be done by removing the stick from the bottom port.

Precautions

❖ Use only dry and fresh chaff or husk in the stove for burning.

❖ Keep the stove away from direct blast of air coming from out side wind as it affects the burning and gasification.

❖ The black colour of the chaff or husk indicates that the volatile matter has been exhausted. Therefore, add more chaff or husk for continuous burning in time.

Maintenance

❖ Remove the ash by inverting the stove after use.

❖ The nut and bolt of the grate, which holds the only moving part of the stove may require periodic tightening.

❖ If the stove requires servicing or replacement of parts contact the fabricator or a tinsmith.