Report on experiment to discover operating characteristics and running costs of an "Esse Century" oil burning Cooker.

The cooker was installed and put into operation on the 18th of May, 1963 at No. 2. Ajax Bungalows. The bungalow being a wooden pre-fabricated building containing two bedrooms a sitting/dining room, kitchen and bathroom.

Description and Operation.

The stove measures 36 ins. wide, 36 ins. high, and 29½ ins. deep. There are two ovens, one with measurements 14 ins. x 16¼ ins. x12ins. the other, 14 ins. x 16¼ ins. x 10 ins. A standard backboiler is fitted in the firebox supplying sufficient hot water for baths and other domestic needs. The hotplate can accommodate six pans. Although the cooker is not designed for space heating it has been found that sufficient heat is emitted to warm the room in which it was installed. Maximum and minimum room temperatures recorded throughout the period being 92° f. and 60° f. respectively.

The cooker is fitted with a pot type vapourising burner which is automatically controlled. Assisted draught is provided by an electrically driven fan. The burner control can be set to any reading up 500° f. The pilot indicating light is extinguished when the required temperature is reached in the roasting oven, and thereafter the temperature is maintained automatically by thermostatic control.

Operation

Oil flows by gravity from an outside fuel tank via a ¼ ins. bore copper pipe to a hand operated cut-off valve and filter fitted to the base of the cooker, thence to the burner control unit, this unit provides a means for accurately and consistently controlling the flow of oil to burner pot. It operates according to the setting of a control knob on top of its cover. The indicator for the knob has eight positions ranging from "High Fire" through five arbitrary points to "Low Fire" and "Off".

The oil supply in this control unit is controlled by a float balanced, gravity applied needle valve, which opens sufficiently to maintain the oil flow according to the control knob setting. Should the flame in the burner pot be extinguished, then the oil level will rise in the burner pot and also by a corresponding amount in the control unit, the action of the rising oil will lift the float and enable the valve needle to fall shutting off the supply of oil. Thereby preventing oil flooding out of the burner pot.

Should any foreign matter pass through the control unit filter and reach the inlet valve to prevent complete closure under its own gravity, the oil level will continue to rise and lift the float to the position where it will trip a safety mechanism. This mechanism functions to apply strong spring pressure to close the inlet valve. After clearing the obstruction the mechanism is reset by pressing a button.

From this oil control unit the oil is fed through a magnetic shut-off valve and a magnetic pilot flame valve. During normal operation the magnetic shut-off valve is always open, the electric windings of the coil of this valve are connected in series with the fan motor. Should the electricity supply fail or the windings of the fan motor open circuit, i.e. become faulty, then in either case the motor would stop and the flame would become very smoky in the burner pot. In such an event the magnetic shut-off valve ceases to be energised and shuts under its own spring pressure thereby shutting off further supply of oil to the burner pot.

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The magnetic pilot flame valve is actuated by the cooker thermostat. When the cooker is calling for heat this valve remains open allowing the metered oil from the control unit to flow freely to the burner pot. When the desired temperature is reached this valve closes but it has a small by-pass hole in it which allows sufficient oil to flow to maintain a pilot flame in the pot.

From the above it will be seen that the cooker is completely automatic in operation, The flame in the burner pot alternating from that pre-set by the control knob on the control unit and the pilot flame, by this method a constant temperature is maintained, that is, that set by the thermostat.

Safety devices as described prevent oil flooding out, through flame failure, electricity supply failure and fan motor failure.

Performance.

During the six months that the cooker has been in operation it has extinguished itself twice. Once due to electricity failure and once due to flame failure. On both of these occassions the safety devices operated to prevent flooding. The flame failure was caused through carboning up of the burner pot.

It is fair to say that the cooker performance is equal to the peat fired "Rayburn" cooker with regard to cooking, water heating and space heating, although it is thought that the temperature rise of the oven and of water takes a little longer than with the "Rayburn". However once this is known no difficulty was experienced in adjusting the thermostat according to needs. There is a continuous noise from the fan motor and the burner flame, the noise level varying according to whether the flame was on full or pilot. Although strange for the first day or so, one soon becomes accustomed to it and as in the case of a refrigerator motor operating it becomes unnoticeable. Owing to the operation of the burner requiring a forced draught, no fumes or smell of oil has at any time been detected.

The chimney flue was swept clean before the cooker was put into operation and examined three months later, half of a small shovel full of carbon granuals were extracted from the root of the chimney breast, the chimney itself being quite clean.

Maintenance.

The Makers recommend that the burner pot be cleaned once every three weeks, it was found that owing to the higher carbon content of the fuel available here, it was advisable to perform this task at more frequent intervals, once every two weeks is recommended. The task is quite a simple one, it can be undertaken by an unskilled person and takes approximately twenty minutes.

Filters and float chamber require cleaning only as required, these have been examined during the six months the cooker has been in operation but no cleaning was necessary. The base filter however at the inlet valve was cleaned twice during the period. The fan motor required a few drops of oil every two months.

A comprehensive set of instructions on the maintenance of the burner and control unit are supplied with the cooker, details of which are not necessary for this report. It is reasonable to say that an unskilled person of the type who would normally attend to minor household tasks, such as, repairing a fuse or fixing a leaky tap would have no difficulty in attending to the routine maintenance required. If however a fault occurred on part of the electrical system then it is likely that skilled help would be required. A nuisance that has persisted throughout has been minor oil leaks from the burner unit, these are by no means serious and amount to possibly a tablespoonful every three days. No matter how tightly the joints were tightened this

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weeping persisted. To combat it a small drip tray was made and placed under the offending parts. This solved the problem, there was no smell of oil from it and the wastage was negligible.

Oil and Electricity Consumptions.

During the period under review daily consumption was practically constant at three gallons per day. Oil therefore consumed in one year would amount to approximately four tons. Current cost of Government oil at tanks is £14. 1s. 8d. per ton.

The electrical loading of the unit is 40 watts. Annual consumption of electricity will therefore be 350 units, at 4½d. per unit this amounts to £6. 11s. 3d.

Summary

During the six months under review the cooker has given satisfactory performance. No difficulties were experienced with its operation by the housewife and as previously mentioned it is thought that normal maintenance and cleaning could be carried out by an unskilled person. There have been no oil fumes or smells of any description. The cost to operate with oil ex Government tanks would be approximately three and half times that of bought peat.

(Sgd.) E. C. Gutteridge.

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