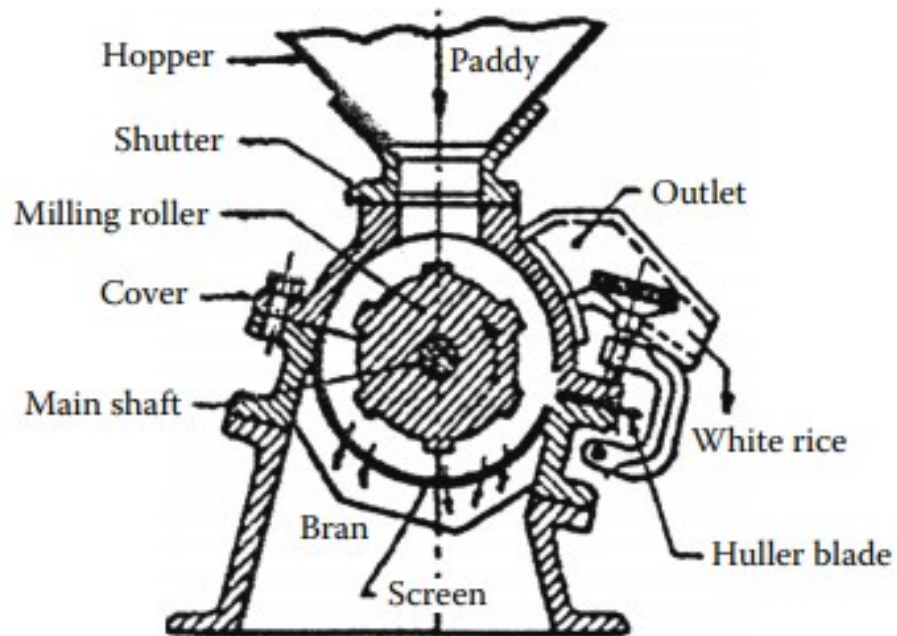


Session 4.2 – Rice Milling

Machinery for Rice Milling

- Single Huller



~~Fig. 10~~ Engelberg-type huller.

Principle of Huller

- The paddy is husked and whitened in the huller by friction and pressure generated in the milling chamber. Both husking and whitening are done by the same machine. The milling can be carried out either in a single pass or in multipasses. Paddy-handling capacity of the common huller varies from 0.25 to 1.00 ton/h. The total rice outturns are about 56% and 64% for raw and parboiled paddy, respectively.

Sheller Mill

- As far as basic milling operations are concerned, the shelter mill is almost identical to a modern mill, except that the husking operation is done by the under runner disk husker (sheller) in place of modern rubber roll husker
- This type of mill consists of (a) a cleaner; (b) one or more disk shellers; (c) aspirator (to remove husk); (d) one or more paddy separators; and (e) one or more cone-type rice whitener. Commonly, the capacities and total power consumption vary from 1 to 2 tons/h and 35 to 50 BHP, respectively.

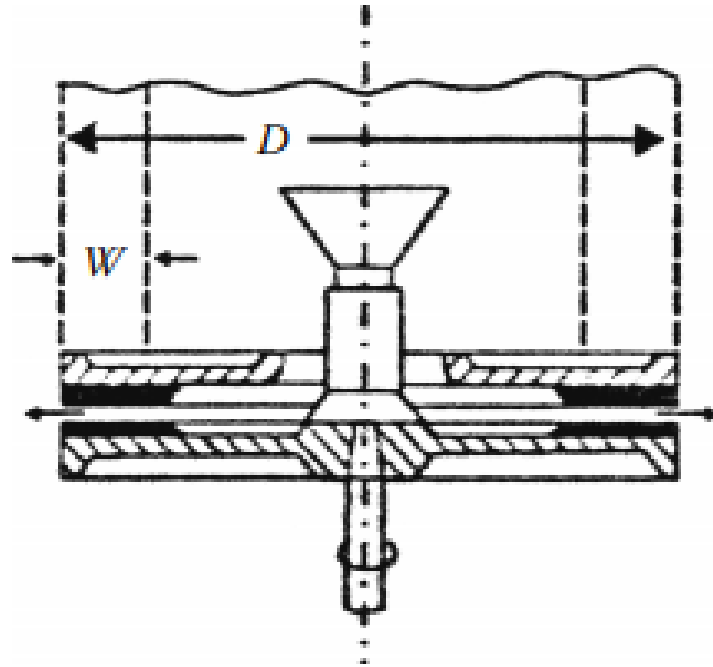


Figure ~~3.1~~ Particulars of the under runner disk sheller.

Modern Rice Milling Machinery

- The modern rice milling machinery can be divided into two major groups: (1) rice milling machinery developed in Japan and (2) rice milling machinery developed in Europe.
- The major operations performed by modern rice mills are : (1) storage; (2) cleaning; (3) husking; (4) separation; (5) whitening; and (6) grading

Rice Milling Operations

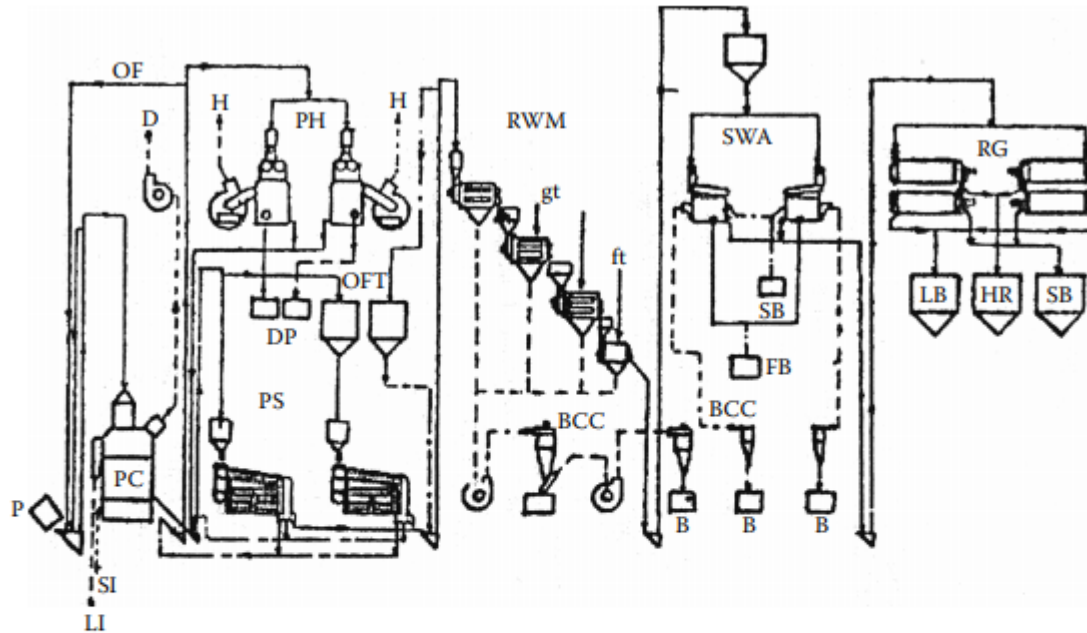


Figure 12.3 OF—Overflow, RWM—rice whitening machines, RG—rice graders, D—dust, H—husk, PH—paddy huskers, SWA—sieve with aspirator, OFT—overflow tank, DP—defective paddy, SB—small broken, LB—large broken, HR—head rice, FB—fine broken, B—bran, BCC—bran collecting cyclones, PS—paddy separators, P—paddy, PC—paddy cleaner, LI—large impurities, gt—grinding type, ft—friction type, SI—small impurities.

Cleaning

- The paddy procured from the farmer may be dried, if necessary, and stored in storage bins, and then it is cleaned with the help of paddy cleaners.
- **Open Double-Sieve Precleaner:** precleaning is performed through open single or double layer oscillating sieves. Sometimes, single sieve–type precleaners are equipped with suction fans also, for aspiration of light impurities
- **Single Scalper Drum Cleaner (Japan):** Used for cleaning impurities such as straws, ears, chaffs, big stones, dust and light impurities, sands, etc. Basically, this machine consists of a horizontal rotating scalper drum, an aspirator, and vibrating sieves

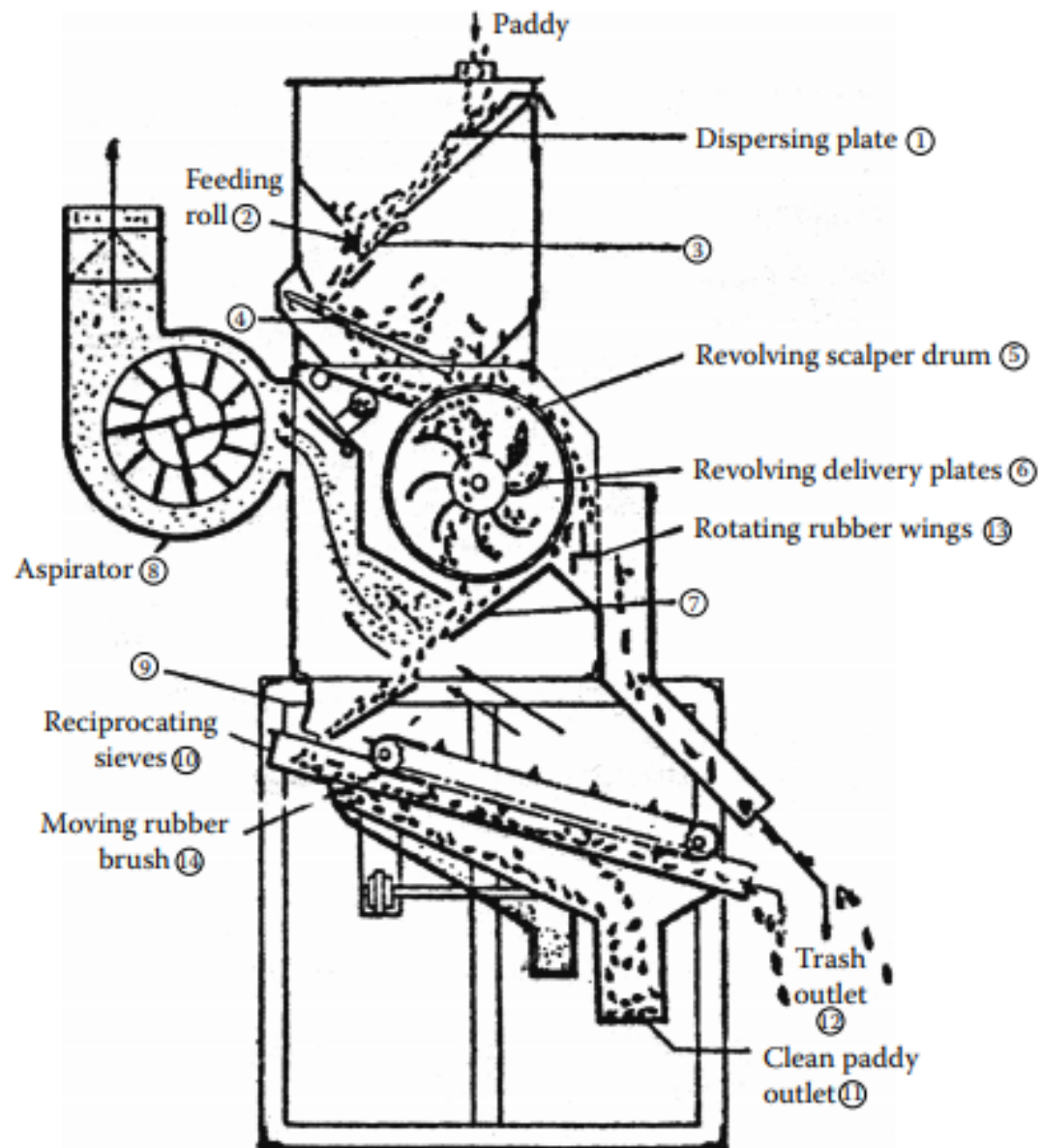
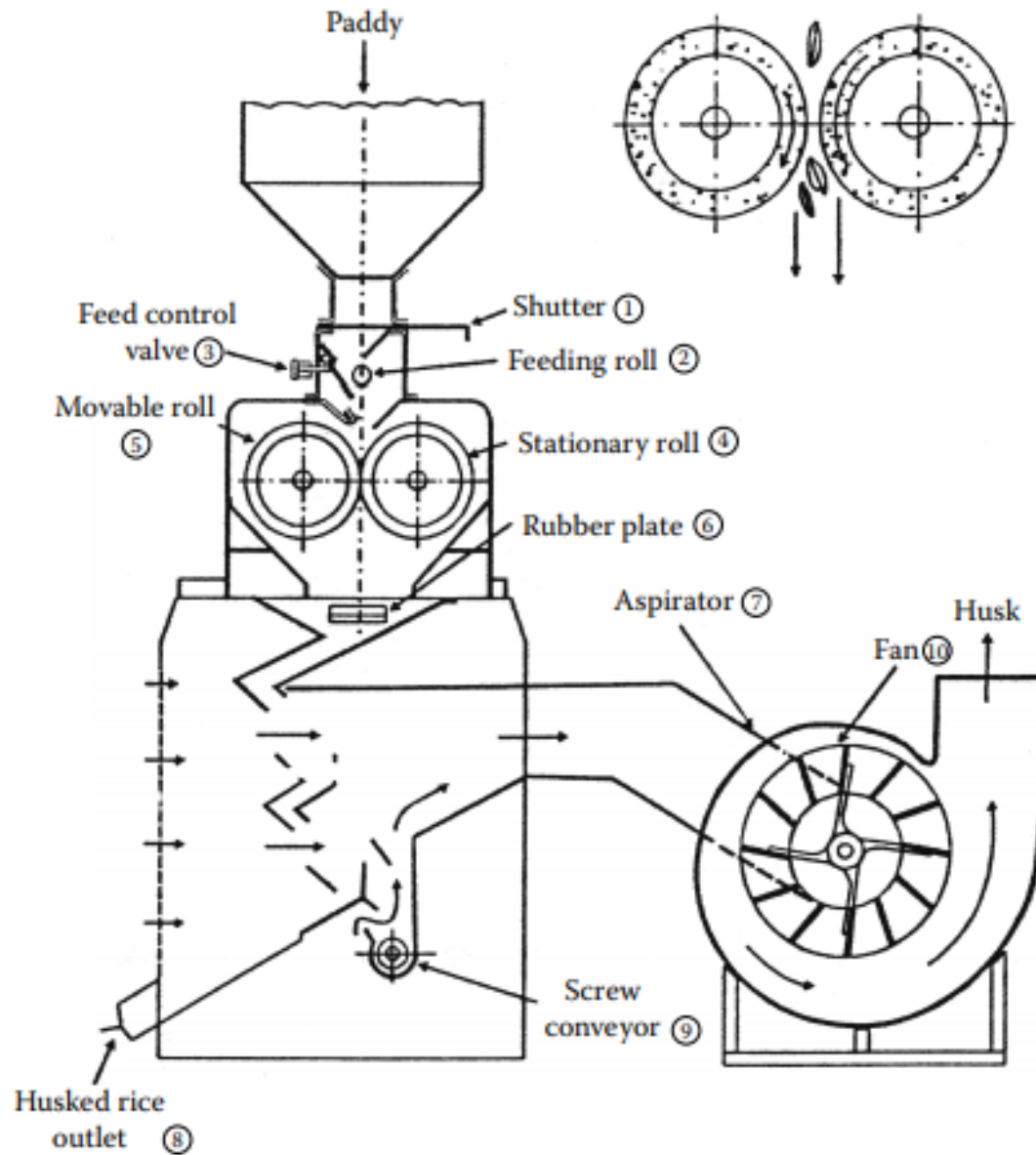


Figure- Single scalper drum-type pre-cleaner (Japan).

Husking

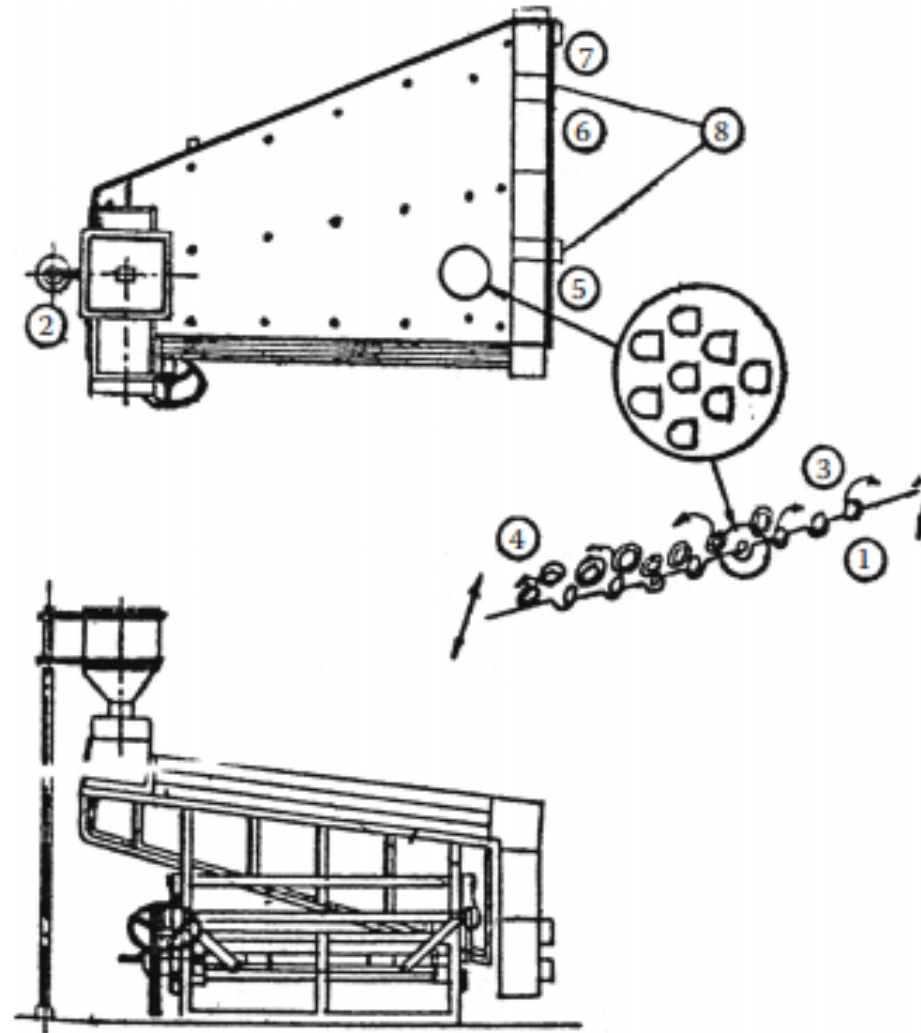
- The purpose of a modern husking machine is to remove husk from paddy without damage to the bran layer and rice kernel.
- Rubber Roll Husker (Japan): If paddy is passed between two resilient surfaces rotating at different speeds in different directions, its husk will be split and stripped off.



~~Figure 10.10~~ Rubber roll husker (Japan).

Paddy Separator

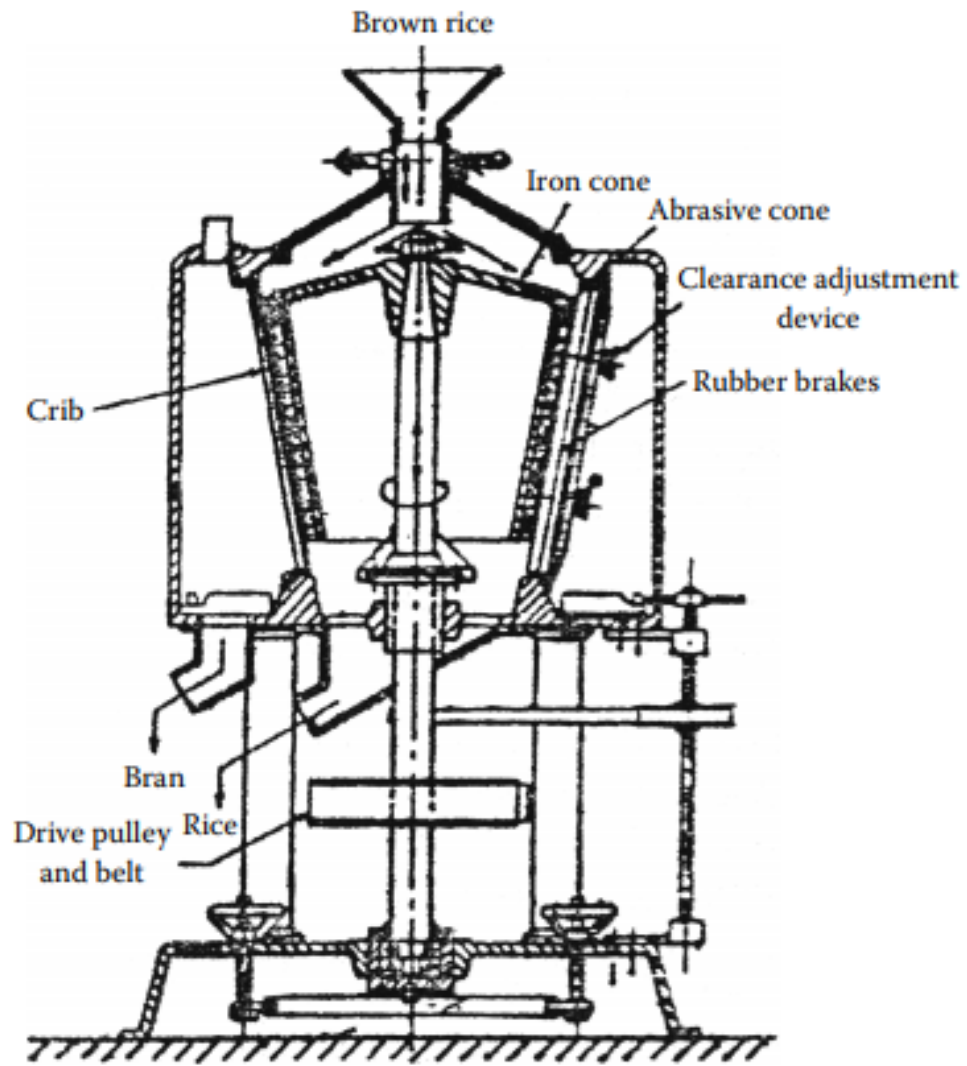
- The paddy separator consists of a number of identical inclined trays with dimples over the surface. These dimpled trays are in reciprocating motion. When a mixture of husked rice and paddy is delivered at the upper corner of the tray, the husked rice being heavier occupies the bottom layer and comes in contact with the dimpled tray, while the paddy, being lighter, floats on the husked rice.



Construction of indented tray-type paddy separator (Japan).

Whitening

- The term “whitening” refers to the operation of removal of germ, pericarp, tegmen, and aleurone layers from husked rice kernels. It is also called “polishing” or “pearling” or “scouring.” There are three major kinds of whitening machines used in the modern rice processing industry.
- Types: (1) vertical abrasive whitening cone; (2) the horizontal abrasive whitening roll; and (3) the horizontal metallic friction-type roll.



~~Vertical~~ Vertical abrasive whitening cone.