Sorting

Advantages of Sorting:

There are a number of benefits, including the need for sorted units in weight-filling operations and the aesthetic and marketing advantages in providing units of uniform size or color. In addition, it is much easier to control processes such as sterilization, dehydration or freezing in sorted food units; and they are also better suited to mechanized operations such as size reduction, pitting or peeling.

Methods of Sorting

Sorting is carried out on the basis of individual physical properties.

Weight Sorting

Weight is usually the most precise method of sorting, as it is not dependent on the geometry of the products. Eggs, fruit or vegetables may be separated into weight categories using spring-loaded, strain gauge or electronic weighing devices incorporated into conveying systems. These systems are computer controlled and can additionally provide data on quantities and size distributions from different growers.

Size Sorting

Size sorting is less precise than weight sorting, but is considerably cheaper. The size and shape of food units are difficult to define precisely. Size categories could involve a number of physical parameters, including diameter, length or projected area. Rotating the units on a conveyor can make size sorting more precise. Sorting into size categories requires some sort of screen, many designs of which are discussed in dry cleaning topic. The main categories of screens are fixed aperture and variable aperture designs. Flatbed and rotary screens are the main geometries of the fixed bed screen and a number of screens may be used in series or in parallel to sort units into several size categories simultaneously. For fruits two rollers or series of rollers are used as shown in Fig 1.

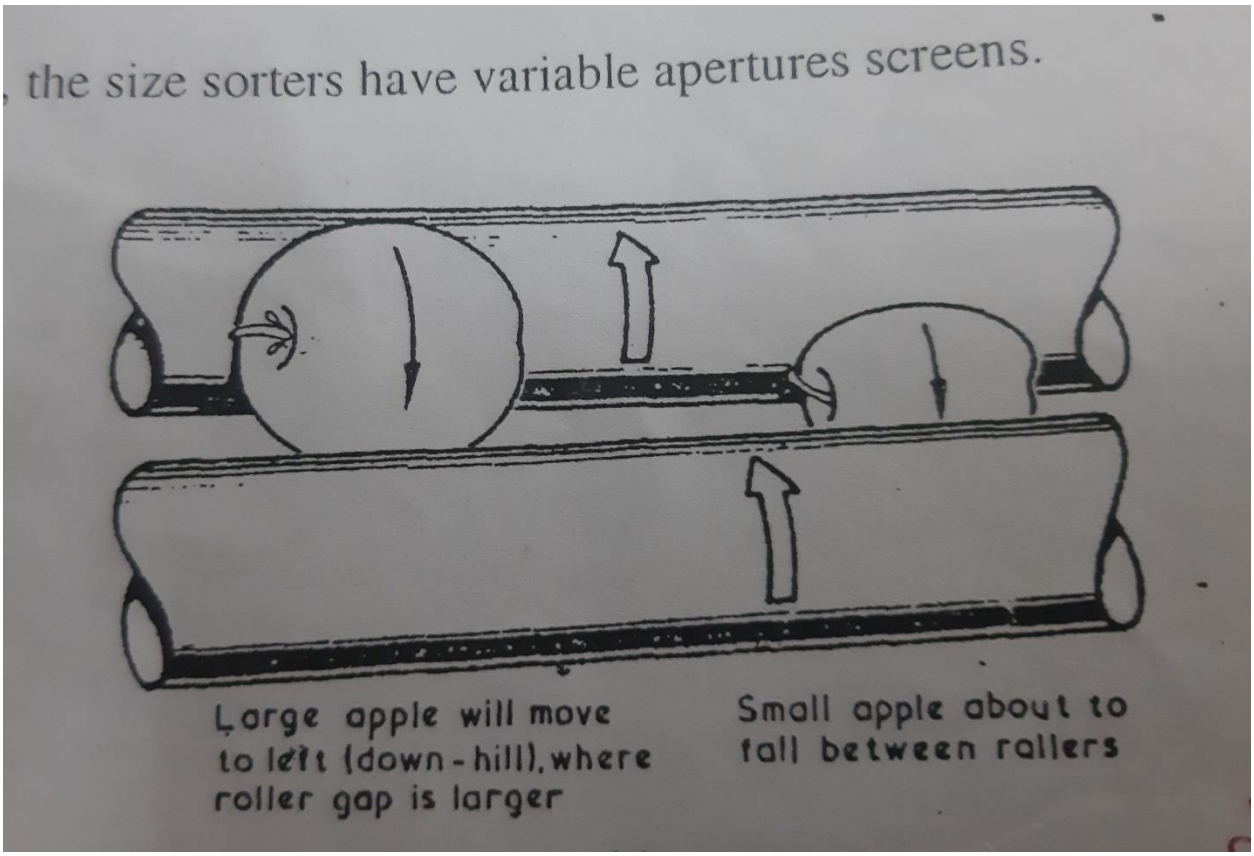

Fig 1. Roller Sorter

Shape Sorting

Shape sorting is useful in cases where the food units are contaminated with particles of similar size and weight. This is particularly applicable to grain which may contain other seeds. The principle is that discs or cylinders with accurately shaped indentations will pick up seeds of the correct shape when rotated through the stock, while other shapes will remain in the feed (see Fig. 2).

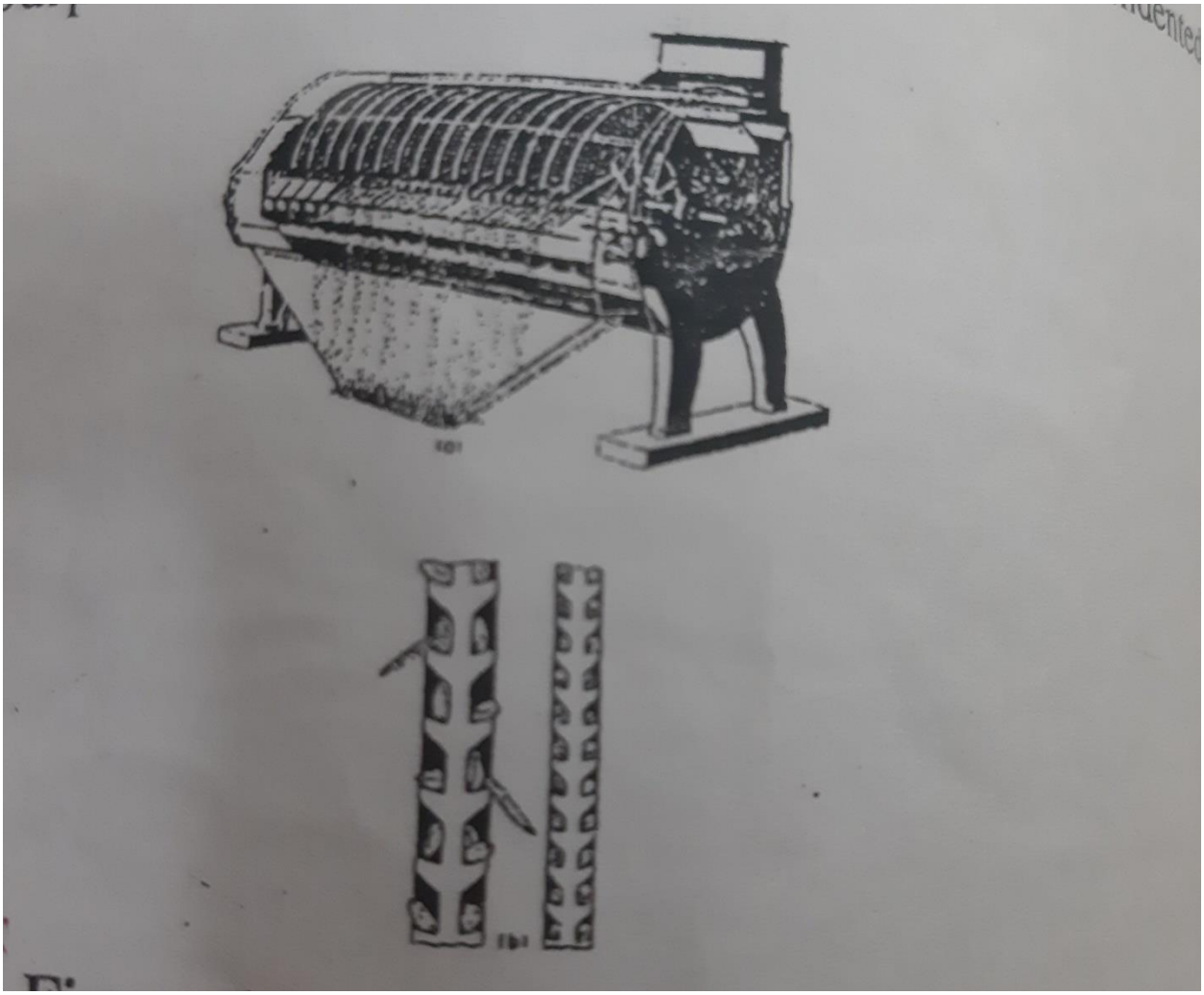

Fig. 2 Cross-section of disc separators for cleaning cereals

Photometric properties may be used as a basis for sorting. In practice this usually means color. Color is often a measure of maturity, presence of defects or the degree of processing. Manual color sorting is carried out widely on conveyor belts or sorting tables, but is expensive. The process can be automated using highly accurate photocells which compare reflectance of food units to preset standards and can eject defective or wrongly colored, e.g. blackened, units, usually by a blast of compressed air. This system is used for small particulate foods such as navy beans or maize kernels for canning, or nuts, rice and small fruit (see Fig. 3).

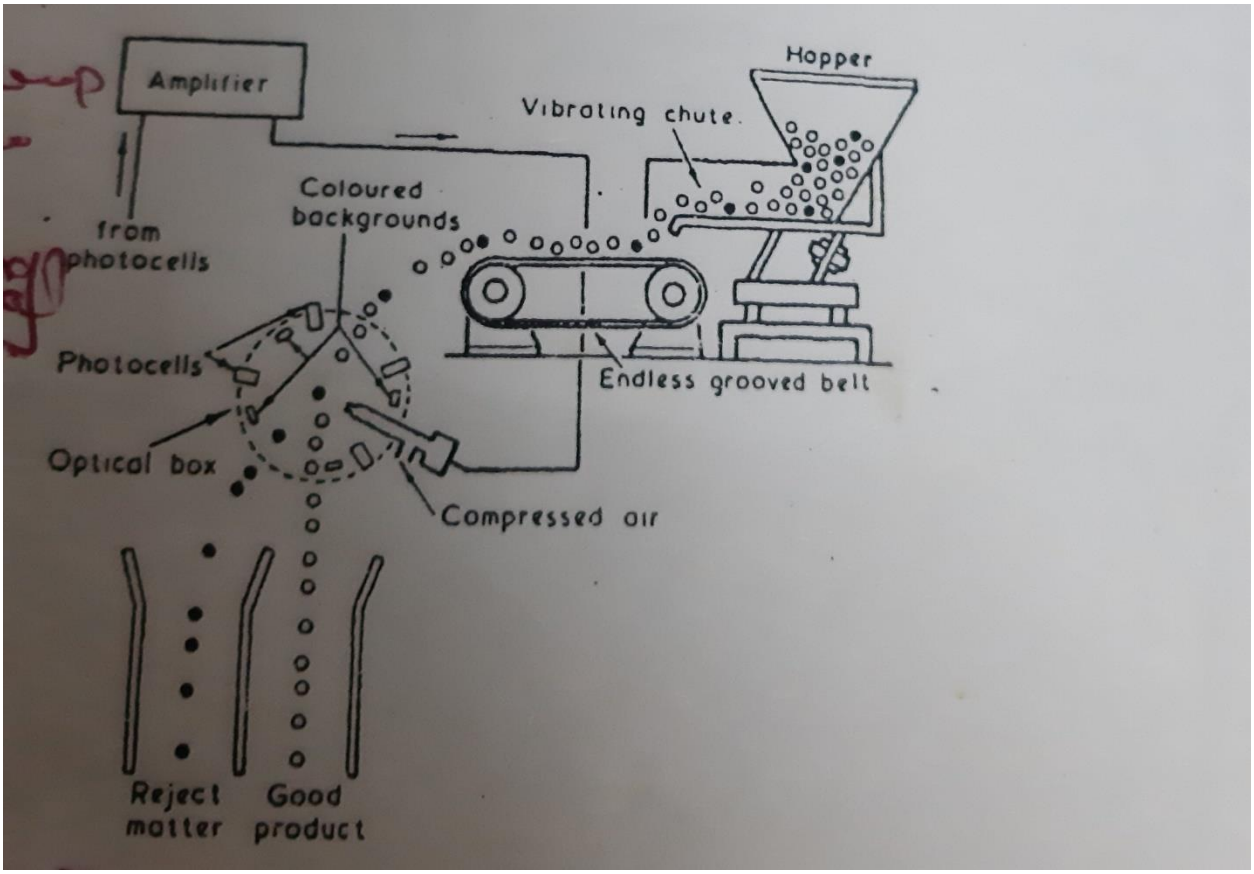

Fig. 3.Electronic Color Sorter