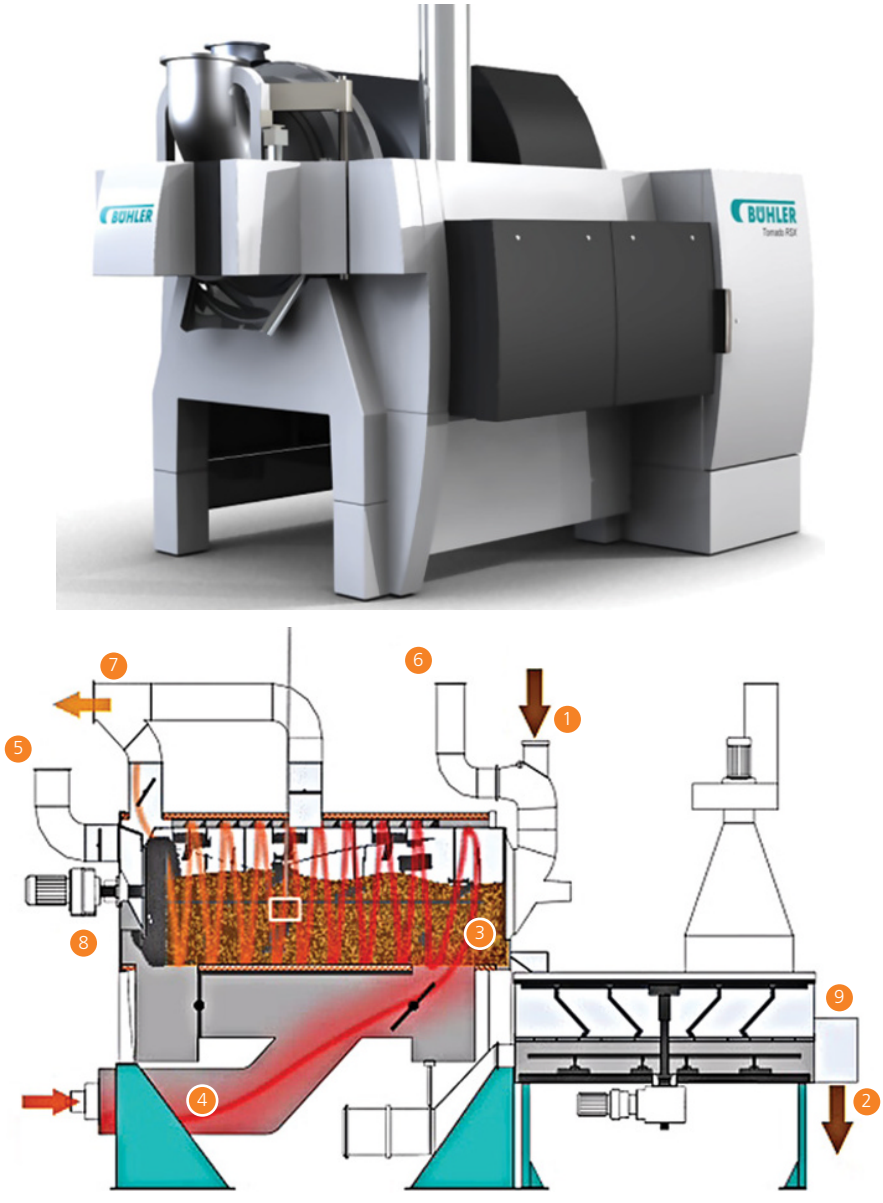

Figure 3.5 Barth Tornado RSX cocoa nibs batch roaster (Bühler AG). (1) Raw cocoa nibs inlet; (2) roasted cocoa nibs outlet; (3) roasting drum; (4) burner chamber; (5) hot air inlet for convective heating; (6) exhaust air from inside drum; (7) exhaust air from outside drum; (8) port for water, steam and other ingredient injection; (9) cooler. Reproduced with permission of Bühler AG, Switzerland.

slots in the shelves, which ensures an even flow of the air in the roaster. The bottom shelves are used for cooling.

Several suppliers also make continuous drum roasters. A continuous flow of nib or beans is fed into a drum, which is heated by a hot air flow. Air temperature and

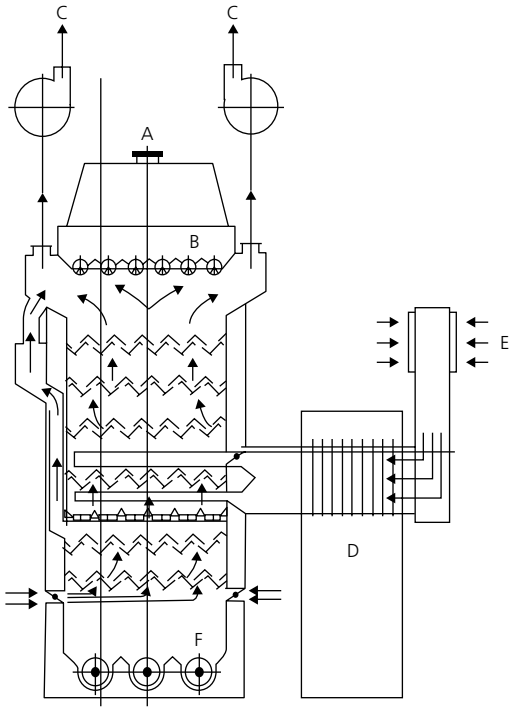

Figure 3.6 Diagram of continuous bean/nib roasting system (Lehmann Maschinenfabrik GmbH, Germany). (A) product feed; (B) feed rollers; (C) exhaust air fan; (D) air heater; (E) air filter; (F) extraction screw.

dwell time regulate the degree of roast. In the JND directly heated continuous dryer/roaster (see Figure 3.7), the process air is typically heated by in-duct gas burners before being channelled through a stationary head plate. As the drum rotates this air is only allowed into those channels that are below the beans or nibs. It then passes through louvres into the beans and partially fluidises them. This cross-flow of air relative to the movement of beans along the drum means that at any point along the length of a section the gas temperature, humidity and flow rate are constant. Usually these types of roasters are divided in two or three sections. Each section can be separately heated and by adjusting the temperature, different flavours can be developed. After roasting the product is cooled in a continuous device.

3.7 Cocoa mass (cocoa liquor)

3.7.1 Grinding cocoa nibs

Cocoa mass is produced by grinding cocoa nibs. Grinding is often a two-stage process: a coarse grinding (see Figure 3.8) followed by a fine grinding stage. As was noted earlier, the fineness to which the mass needs to be ground depends upon its final use. An example of a ball mill used for fine grinding is shown in