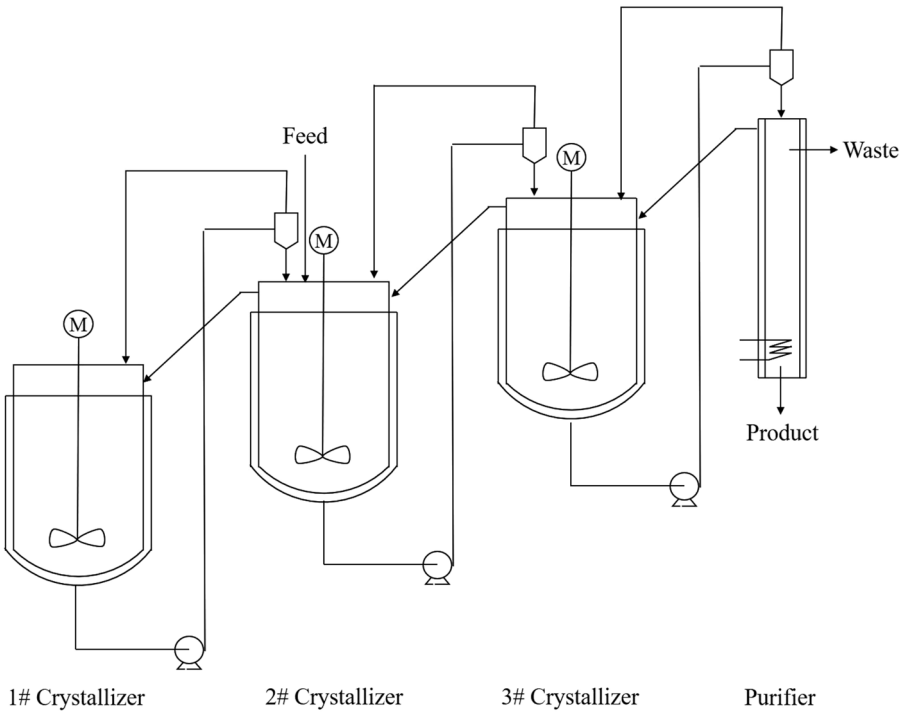


**Figure 11.11** CCCC crystallizer.

crystals are dragged upwards by the flows to form the solid bed on the top. The top crystal layer could be scraped off by the harvester and conveyed to the melter. Similarly, part of the melt flows downwards to wash the upwards moving crystals and leaves from the sidewall filter. Results have shown that the movement of crystals has been positive and not as dependent on the crystal size as in some other purifiers.

### *11.4.1.10 Counter Current Cooling Crystallization (CCCC Crystallizer)*

The CCCC crystallizer[3,28] was developed in Japan and commercialized in 1983. It is composed of 3 crystallizers and 1 purification column, as shown in Figure 11.11. In each crystallizer, stirrers with scrapers are employed to promote mass transfer and prevent encrustation on the inner supercooled surface. Feed flow of raw material is added into 2# crystallizer and mixed with the mother liquor from 3# crystallizer before undergoing the recrystallization process. The slurry is separated and the crystals go to 3# crystallizer, while mother liquor goes to 1# crystallizer. Crystals from 3# crystallizer are finally transported into the purification