Electrolyte-agitation systems: To avoid the detrimental effects of acid stratification in flooded batteries, electrolyte-agitation systems are an effective solution. Figure 18.22 shows a battery with an agitation system. Most systems are based on compressed air that is pumped to the bottom of the cells. The ascending air bubbles cause an electrolyte circulation and mixing.

Recombinators: To reduce the loss of water from flooded batteries, recombinators are used. They consist of a catalyser that recombines the hydrogen and oxygen gas evolving from flooded batteries. Figure 18.22 shows a battery with recombinators.

18.4.7.6 Operation strategies

The operation strategy and the charging strategy have an important impact on the battery lifetime. Therefore, in the following paragraphs some ideas on appropriate strategies are discussed.

In most PV systems, the system and the battery control are realised through the charge controllers; in some cases energy management systems take over this job. The battery requires proper handling of frequent full charges, gassing for electrolyte-stirring in flooded batteries, control of end-of-charge voltage and deep-discharge protection.

Figure 18.22 Flooded, tubular-plate battery (2 × 240 Ah in parallel connection, 12 V) with gas recombinators for reduction of water loss through gassing and an electrolyte-stirring system to avoid acid stratification (only connected to the right hand unit), the membrane air pump is mounted on the wall, operation of the pump: twice a day for 15 min, (Picture courtesy Fraunhofer ISE)