MULTIPLE-UNIT, ALL-GLASS ROTARY EVAPORATOR

by Ymir

Commercial rotary evaporators employing glass components throughout are available only as single units; multiple-unit commercial evaporators having metallic parts are subject to corrosion and may cause sample contamination. To overcome these disadvantages, a four-unit, all-glass apparatus has been constructed. This apparatus has performed satisfactorily for more than a year with periodic cleaning and oiling of the metal parts and chains and lubrication of the ball joints.

Design. Only a single unit is illustrated with a sectional view of the rotating glass connector. The sample flask, A, with a std. raper 24/40 joint Is connected to the rotating Pyrex glass connector, B. A vacuum seal is maintained by a 20/35 spherical joint, C, which is connected to the side arm of a Friedrichs condenser, D, modified so that the side arm, carrying a 20/35 female spherical joint, is inclined at 15: below horizontal. D is connected via a 24/40 joint to the receiver flask, E. A three-way stopcock, F, is attached to the receiver side arm, and also connects to the vacuum line or to the atmosphere.

The rotating connector, B, is mounted within a brass sleeve, G, (1-in. inside diam.) and is secured by a tight-fitting rubber sleeve, H, which is cemented in place. Two ball races, J, are mounted on each sleeve to reduce wobble, and are in turn mounted in bracket K. A 1/2-in. diam. side arm, L, on each bracket is attached to a vertical 1/2-in. support rod via a clamp. This allows the rotation of the connector assembly to any desired angle. The multiple unit is chain-driven by a motor mounted at one end at 15: below horizontal. Each unit is coupled to the preceding one. Three of the units have 2 sprockets, M, on sleeve G, and the last unit, a single sprocket. The four units are appropriately driven at 57 r.p.m. by a motor delivering about 131 in./lb. torque.

A thermostatically controlled water bath, N, is mounted to the rear of the units. Vertical support rods are mounted on a base board 4.5 in. apart, and cross-braced for rigidity. To these are attached clamps for supporting the condensers and receiving flasks. This spacing permits the use of flasks up to 500-ml. capacity.

In operation, a rotating vacuum seal is maintained at the spherical joint by a high temp. vacuum grease (e.g., Apiezon T). Std. ball (20/35) joints were selected in order to avoid constricting the vapor path between the flask and condenser. joints of such a size, however, require a torque of about 20 in./lb. for rotation under vacuum, when cold and lubricated with

Apiezon T.