A LABORATORY SHAKER FOR CHEMICAL EXTRACTION OF SOIL AND PLANT SAMPLES

A shaking machine that will accommodate a number of receptacles of various types and sizes and with displacement action such that all particles are in contact constantly with the extracting solution is illustrated in figure 1.

The stationary frame is constructed mainly of 1 1/4-inch iron pipe. Angle irons are welded to this pipe and support the central shaft of the rotating frame. The rotating frame consists of 2 flat straps 3/8 by 2 by 36 inches welded at right angles to the central shaft and extended out to receive the horizontal pipe sections which carry the adjustable individual rods. The 5-foot central shaft is 15/16 inch square shafting turned at the ends to 3/4 inch diameter to fit the standard 3/4-inch self-aligning bearings and the large pulley (used 26-inch cultivator wheel obtained from a junk yard). At 6-inch intervals the square shaft is bored and tapped for 5/16-inch countersunk screws which hold the sheet metal (16 gauge) saucers. The basal and top diameters of these saucers are approximately 1 1/2 and 5 inches, respectively. Circles of rubber (inner tube) cemented to the saucers provide facings which tend to cushion and hold glassware. Funnel-shaped coupling which in turn are screwed to the 11-inch threaded 3/8-inch rods comprise the upper part of the receptacle holding assemblies. The limiting diameters of the funnels are approximately 1/2 and 2 1/4 inches, respectively. The adjustable funnel rods are held in any desired position by winged set screws which screw through nuts welded on the horizontal pipe sections at right angles to the rods.

These receptacle assemblies with dimensions described will accommodate bottles up to approximately 13 inches in height and having basal diameters between 1 1/2 and 5 inches and up to number 11 stoppers. The bottles are held by compressing the stopper slightly through pressure applied by hand on the funnel rods and then tightening the set screws securely. With this arrangement for holding bottles, there is no chance that the stoppers will loosen until the funnel rod is released. It is imperative that the funnels and saucers are symmetrical and that the plane of displacement of each funnel rod is directly in line with the center of the saucer which, in turn, must be at right angles to the rod.

The electric motor (1/8 H.P.) with V-belt drive provides extremely quiet operation. With a motor speed of 850 rpm and 1 1/4- and 26-inch pulleys, the shaker rotates at approximately 40 rpm; this is slow enough so that solutions will run back and forth in the bottles as the shaker rotates. The dimensions of the shaker could be easily reduced or increased to accommodate other sizes or numbers of receptacles that might be desired. The size and weight of materials used in the construction of this shaker have proved adequate.—D. L. HALLOCK and G. B. DUKE, Associate Agronomist and Agricultural Engineer, Virginia Agr. Exp. Sta. and Farm Machinery Section, A.R.S., U.S.D.A., respectively, Tidewater Research Station, Holland, Va.

Fig. 1.—General view of shaker and motor, showing its adaptability for bottles.

1 Received June 9, 1956.
2 This shaker is modeled after a machine catalogued in Germany some 50 years ago, but not listed in this country by apparatus firms.