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Hanging Magnetic Stirrer Which Minimizes Cell Disruption

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A magnetic stirring bar enclosed in tubing forms a large paddle which produces good mixing at slow rotational speeds. It is suspended above the bottom of the vessel and cannot grind cells or become misaligned.

Many organisms grow poorly when a magnetic stirring bar is used to agitate the culture medium. Mixing shear seems to be sufficient to rupture some cells when the bar rotates rapidly, and cells caught between the bar and the bottom of the vessel can be torn apart. A device which provides thorough, gentle mixing has been fabricated from stainless-steel rods, rubber tubing, and a magnet. It could work equally well if other materials of construction were substituted.

A stirring arrangement for a flask is shown in Fig. 1. The main shaft is a piece of stainless-steel welding rod. It is forced through a hole in the bottom bar and jammed tight by hammering on the end. The support for the shaft is another bar (labeled swivel) in which a hole has been drilled. The shaft fits loosely in this hole and is prevented from falling through by a collar. Contact occurs mainly between the collar and the swivel as the shaft rotates. The swivel bar fits snugly in the rubber stopper, and other holes (not shown) can provide for adding air or medium and for air exhaust or removal of medium or samples. After positioning the device in the lid or stopper of the vessel, measurements are taken. Excess shaft is cut off, and the collar is fixed by a sharp blow with a center punch. A rubber bulb is slipped down over the swivel bar to prevent entry of contaminants.

The magnet need not be coated; a suitable magnet can be salvaged from a broken glass-coated stirring bar. It is pushed into the center of a piece of tubing, ends of which then go on to the stainless-steel bar. Gum rubber autoclaves well and provides flexibility for inserting the stirring device through a small opening.

The stirrer gives good mixing at slow rotational speeds and shows little tendency to wobble. It can be used in vessels with raised bottoms. Whereas a conventional stirring bar can easily leave the magnetic field of the driving unit and rest helplessly in a remote area of the vessel, the hanging stirrer always stays aligned.

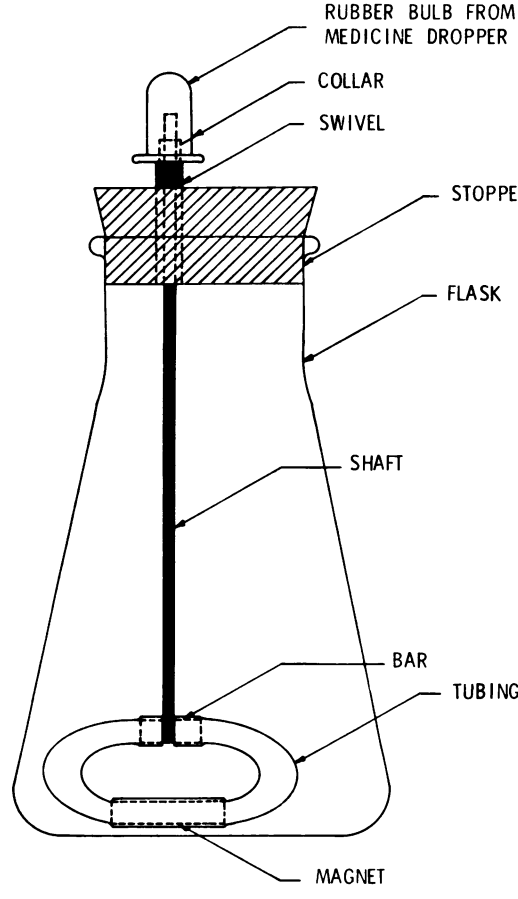

FIG. 1. *Stirrer hanging in flask.*