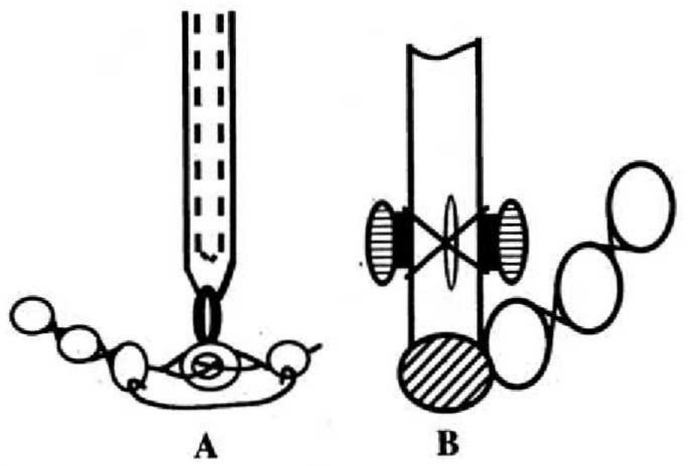
Modified Hershberg Stirrer



The Hershberg stirrer is very effective for agitating light slurries (Grignard reactions) and moderately viscous liquids (*1, 2*). This stirrer does not appear to be commercially available and consequently is of local construction. A reproduction of a published drawing (*1, 2*) is shown as **A** with a portion of the right half (two loops) omitted. Other loops may be added to the upper glass ring and there usually is additional bracing, which is not shown. There is a limit to bracing if the loops are to be tilted to permit insertion of the stirrer into a narrow-necked flask. The Hershberg stirrer can be constructed in a variety of shapes to fit the contour of the flask. The original Hershberg stirrer was constructed from glass tubing and no. 18 B.&S. Nichrome or Chromel wire. For extremely viscous liquids (polyphosphoric acid at room temperature) heavier Nichrome or Chromel wire (no. 16) is required to overcome bending and at times wrapping the wire loops around the shaft during vigorous stirring. This additional stress frequently resulted in a broken stirrer with the glass loops being particularly vulnerable. To strengthen the stirrer, massive pairs of buttons (upper pair shown as horizontal stipple and lower pair as diagonal stipple of **B**) were fused at 180° onto the stirring shaft (ground rod 12.5 or 19 mm diameter with **B** drawn to scale for a 12.5 mm shaft) in place of the glass circles. The wire portion of the stirrer **B** is constructed by: a) Selecting the appropriate length of Nichrome or Chromel wire and preparing half of the stirrer loops (usually three or four), as shown for the right half of **B**, and curved to fit the contour of the flask. b) Attaching the part constructed above to the stirring shaft using the lower set of buttons as an anchoring point. The wire is woven around the shaft as illustrated with the upper set of buttons of **B**. c) Repeating steps a and b using the upper set of buttons of **B**. Ace Glass Inc. adapters (catalog no. 5030B and no. 8065 are suitable for the 12.5-mm and 19-mm shaft, respectively) may be used to attach the stirring shaft to a flask.

These changes result in a sturdy device that retains the stirring characteristics of **A**. In contrast to **A**, the rigid attachment of the wire loops to the stirring shaft of **B** prevent its introduction into a narrow-neck flask. Wide-mouth flasks of local construction or commercial ones (Ace Glass Inc., reaction flask no. 6476) are used instead.

Literature Cited

1. Hershberg, E. B. *Ind. Eng. Chem., Anal. Ed.* **1936**, *8*, 313.
2. Pinkney, P. S. *Org. Synth., Coll. Vol. 2* , Wiley: New York, 1948, pp 116-119.

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