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AN AUTOMATIC REAGENT DISPENSER FOR SHIPBOARD USE¹

BY

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Recent work on modification of the molybdenum-blue method for determination of dissolved inorganic phosphate in sea water (Wooster and Rakestraw, 1951)³ showed the need for a simple rugged device suitable for rapid and precise delivery of small quantities of reagents at sea. The two reagents used for phosphate determination impose additional requirements on this device. Molybdic acid solution must be protected from the light and must not be allowed to come in contact with rubber; stannous chloride solution must be protected from contact with the atmosphere.

An automatic reagent dispenser which meets these requirements is shown in Figs. 1 and 2. Volume of reagent delivery is governed by travel of the spring-loaded syringe plunger, which in turn is controlled by a series of carefully machined steps. Dimensions of these steps are determined by bore of the syringe plunger and by delivery volume required. The syringe assembly, acting through a length of Tygon tubing, pumps mineral oil which comes in contact with the reagent solution at an oil-reagent interface. After the delivery system of the dispenser has been loaded by withdrawal of the plunger, unit delivery of reagents is effected by stepwise release of the plunger. In order to protect reagents from light and glassware from breakage, glassware and reagent bottle are customarily enclosed in a wooden box. This box is provided with an opening into which can be inserted the sample bottle to which reagents are to be added.

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³ Wooster, W. S. and N. W. Rakestraw, The estimation of dissolved phosphate in sea water, *J. Mar. Res.*, 10 (1): 91-100, 1951.

Two such dispensers were calibrated by weighing deliveries of distilled water. One dispenser made 20 deliveries, using each step in succession, with an average volume of 0.205 ml and a standard deviation of 0.004 ml; the other dispenser made 20 deliveries with an average volume of 1.002 ml and a standard deviation of 0.010 ml.

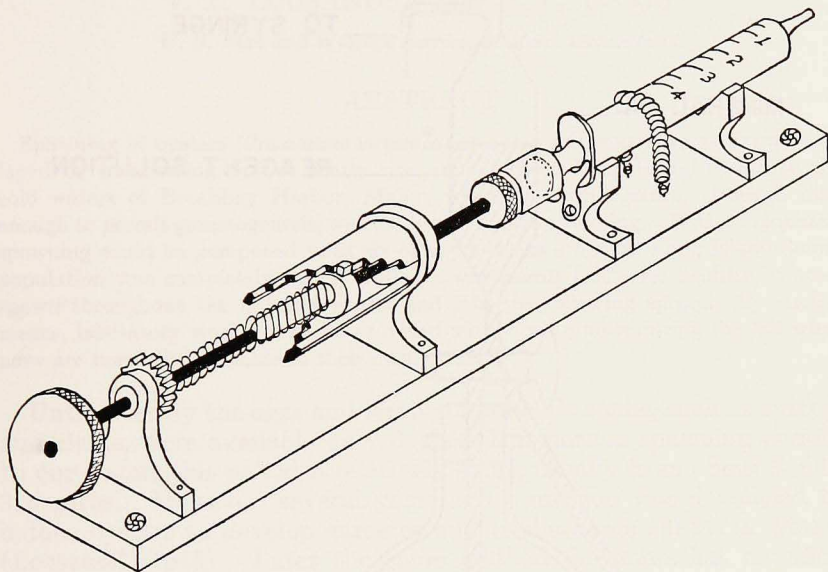


Figure 1. Syringe assembly for delivery of 0.50 ml.

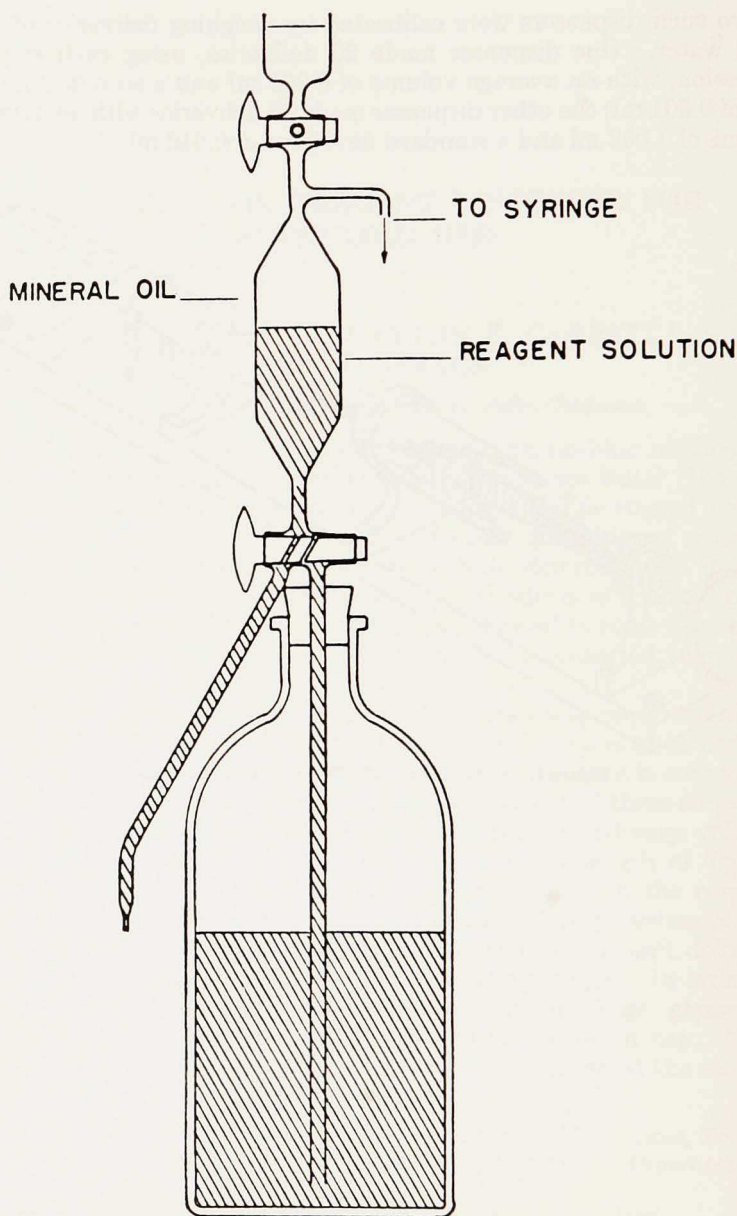


Figure 2. Glassware for automatic reagent dispenser.