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An Inexpensive, Accurate "Injection Gun"

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Our investigations of the rickettsiostatic activities of compounds related to *p*-aminobenzoic acid[2] and the effects of tritium oxide on the growth of rickettsiae[3] required that many different compounds or different levels of activity of tritium oxide be injected into embryonate eggs. Quantities of each compound or each activity of tritium to be tested in a given experiment were dissolved in an amount of distilled water such that each 0.4 or 0.2 ml of solution contained the amount of reagent to be injected per egg. Finger held, digit powered 5-ml syringes could not be controlled with sufficient accuracy. The use of a single 1-ml syringe filled to contain the correct amount of solution to be injected into each egg for a group of 30 eggs increased greatly the probability of bacterial contamination. The use of a 1-ml syringe for each egg was awkward and time consuming; the washing and sterilization of the 100 or more syringes resulting from the injection of 3 to 4 series of eggs required also much time. Automatic pipetting syringes could be adjusted to fill correctly, but, at the volumes used, were inaccurate on discharge.

In the light of the above, we have developed a simple, inexpensive, accurate, trigger operated "injection gun." An exploded view of the gun assembly is shown in figure 1.[4] The apparatus consists essentially of a caulking gun modified by the addition of two saddles to position and hold securely a 5-ml "multifit" syringe.[5] Each squeeze of the trigger, using the large notches of the actuating rod, advances the plunger of the syringe a distance sufficient to discharge approximately 0.4 ml of solution. A single filling of the syringe contains sufficient solution, therefore, to inject 12 eggs. Several fillings sufficed to inject a given series (30 eggs) and this was accomplished in 4 min. By rotating the actuating rod, to engage the finer notches, each squeeze of the trigger discharges approximately 0.2 ml of solution.

Variations in the amounts delivered were determined by weighing 30 consecutive samples on an analytical balance and converting to corrected volumes. When

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[4] Detailed construction plans can be obtained from: Dr. H. K. Ihrig, Research Laboratories, Allis Chalmers Manufacturing Company, West Allis, Wisconsin.

[5] Becton, Dickinson and Company, Rutherford, New Jersey.

set to deliver 0.4 ml of solution the mean amount of solution delivered was 0.390 ml with a standard deviation of ±0.015 ml; set to deliver 0.2 ml, mean delivery was 0.201 ± 0.021 ml.

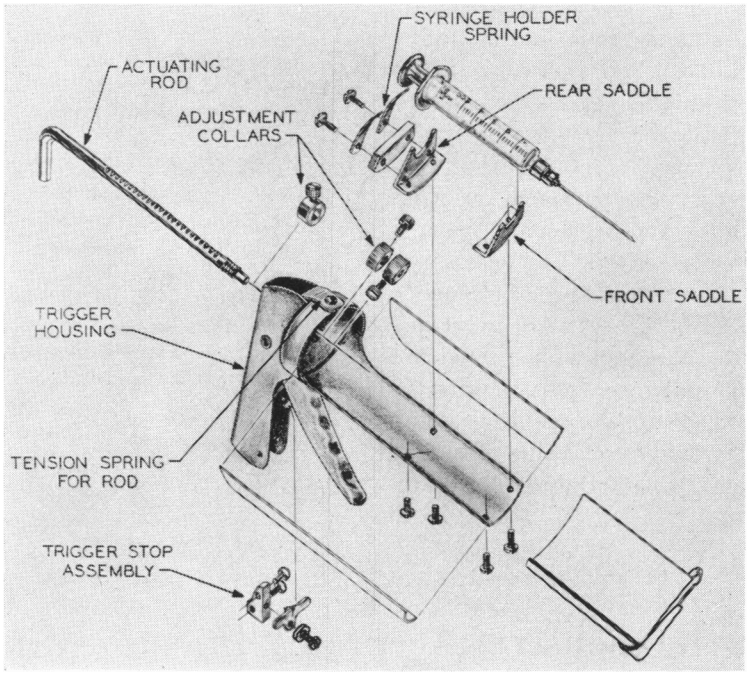

Figure 1. Injection gun