

An improved version of the 'aspirator gun' – a device for collecting arthropods

FERENC TÓTH

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Abstract

In this paper I discuss improvements to a one-handed mechanical device known as an 'aspirator gun'. The main structural change is that while the previous version of the aspirator gun contains one pump and two check valves, the new device contains two pumps (a pair of bellows), four check valves and a direction switch. As a result of this modification, the airflow can now be either long and controlled (e.g. to vacuum many ants or fruit flies) or short, pre-set and triggered (e.g. to capture fast-moving insects or spiders). The direction of the airflow is also alterable, so that the captured insects can be blown out.

Key words: aspirator gun, arthropod collecting, pooter

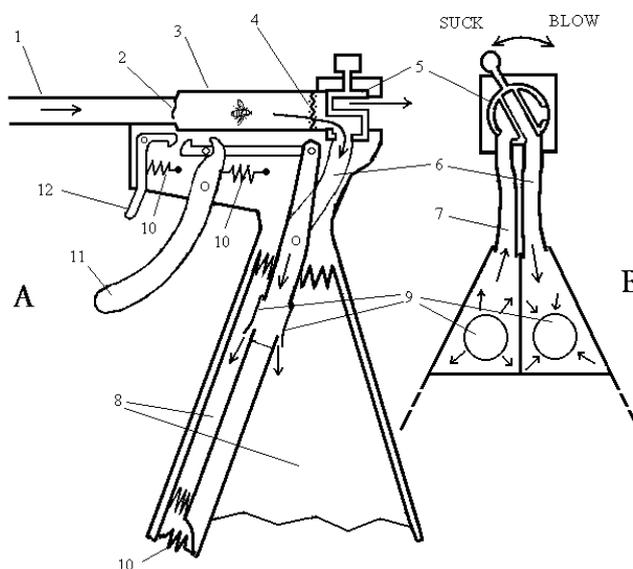
INTRODUCTION

Lung-operated aspirators (pooters) provide a continuously controlled long airflow, but their use can cause discomfort and can be dangerous (inhalation of fungal spores, pollen, dust, excrements or hairs of the arthropods, etc). There are several types of gun-like aspirators. Motorised aspirators (Wade and Wade 1993) require additional energy sources, e.g. batteries. Mechanical aspirators (Schuman 1976; Zoz 1987; Winnicki 1988; Fahringer 1989; Brandstetter 1993; Ott 1994; Tóth 1999, 2000) provide only short and pre-set airflow. Most of these machines require both hands when the machine is made ready for shooting. Mechanical aspirators operating with a piston pump (Schuman 1976; Zoz 1984; Winnicki 1988; Ott 1994) and/or a stored vacuum (Schuman 1976; Zoz 1987; Fahringer 1989) are sensitive to dust.

DESCRIPTION

The new device (Fig. 1) consists of a catching

tube (1), a flap-door (2), a transparent collection chamber (3) with a sieve (4), a direction switch (5), a flexible suction tube (6), a flexible blow-tube (7), a pair of bellows (8) with two check valves (9) on both, three springs (10), a pump arm (11), and a trigger (12). Pressing or releasing the pump arm makes one of the bellows expand and the other compress. Repeated movements of the pump arm generate a continuous airflow in the catching tube and the collection chamber. Accelerating or decelerating of the movements regulates the air speed. The position of the direction switch determines whether the air moves into or out of the catching tube and the collection chamber. When the direction switch is in the 'suck' position, the suction tube is connected with the collection chamber and the blow tube directly with the atmosphere. The vacuum draws the insect into the collection chamber through the catching tube and the sieve stops it. The 'blow' position creates the opposite effect: the captured insect

**Fig. 1.**

Improved aspirator gun.

(A) Through section;**(B)** Cross-section.

1, catching tube;

2, flap-door;

3, transparent collection chamber;

4, sieve;

5, direction switch;

6, flexible suction tube;

7, flexible blow-tube;

8, a pair of bellows;

9, check valves;

10, springs;

11, pump arm;

12, trigger.

Arrows inside the device indicate the direction of the airflow.

is ejected from the collection chamber through the catching tube. Airflow can be very quick and short as well: a firm pumping movement fixes the bellows; with bellows fixed triggering is made possible. This is essential: collecting fast moving arthropods requires high aiming precision.

ADVANTAGES AND DISADVANTAGES

The improved aspirator gun is non-motorised and one-handed. In contrast to the piston pumps the bellows are not sensitive to dust. The airflow can be either long and controlled (e.g. to vacuum many ants or fruit flies), or short, pre-set and triggered (e.g. to catch fast-moving arthropods). The direction of the airflow is alterable, so that the captured animals can be blown out. Inevitably, when these improvements were made to the aspirator gun, the structure became more complicated: as a result, this has increased the potential manufacturing time and cost.

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