droplets reached the cages in which the mosquitoes were exposed than was the case with the diesel oil fogs.

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A SIMPLE CONVERSION OF A BACK PACK MIST-BLOWER INTO AN EFFICIENT POWER ASPIRATOR

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ABSTRACT. A very efficient and powerful aspirator was designed from a gaspowered backpack mistblower. The conversion requires five basic parts: (1) an adapter joining the flex hose to the intake port of the mistblower; (2) the flex hose; (3) a collection-carton holder joining the flex hose and holding the (4) collection carton; (5) the mounting bracket. All parts are available at most hardware stores. The adapter and mounting bracket must be constructed to fit the specific mistblower. Fifteen to 20 minutes are required for the conversion or back again. Detailed description and photographs are included as well as field data illustrating its utility.

During the summer of 1973 studies on mosquito ecology required our sampling resting populations of adult mosquitoes, specifically blood-engorged females, and adult males. Attempts to sample this group of insects using conventional sweep nets failed because the floral composition of the study area did not readily permit sweeping. Sweeping also damaged the insects. Consequently it became evident that some form of power aspirator was needed.

Power aspirators of sufficient size for extensive arthropod sampling were first reported by Dietrick *et al.* (1959) and Dietrick (1961), who described a backpack gas powered aspirator. While commercially available, the cost and acquisition time were considered too great for our needs. Stern *et al.* (1965) later described the conversion of a self-propelled, high clearance pesticide sprayer into an insect-collecting machine, using the Berlese separator principle of Dietrick. Bidlingmayer and Edman (1967) further described slow moving vehicle-mounted aspirators designed to collect mosquitoes. However, the cost, construction time, and the terrain characteristics of our study area did not warrant the acquisition of vehicle-mounted equipment. Davis and Gould (1973) described the first battery-powered, hand-carried aspirator of sufficient size to sample resting mosquitoes, but the description of this machine was unavailable at the beginning of our study.

Many entomological research institutions such as ours have in their possession back-

pack mistblowers for use in insecticidal research; it occurred to us that the design for blowing air might easily be convertible into a useful and powerful aspirator. Therefore, faced with specific needs and limited time, the following power aspirator was adapted from a 2-cycle Keichens ® backpack mistblower for just under $10. The following five parts must be assembled before the unit is operational: (1) adapter joining the flex hose to the intake port of the mistblower; (2) the flex hose; (3) a collection-carton holder (bearing the handle) joining the flex hose and holding the collection carton; (4) the collection carton; (5) a mounting bracket. All supplies are available at most hardware stores.

The first adapter consists of two parts: a flanged 4" aluminum duct 3" long (Fig. 1, B) (cut from a clothes dryer wall exhaust vent), and a ¾" plywood ring (Fig. 1, C) 6-⅝" diameter with a 4" hole through which the aluminum duct is inserted.

The flex hose (Fig. 1, E) (purchased as clothes dryer exhaust flex hose) is 8 ft long when stretched, and is attached to the adapter by a ring clamp (Fig. 1, D). This length was sufficient to allow the operator maximum extension.

The collection-carton holder (Fig. 1, I) was constructed from sheet aluminum shaped into a cone so that the smaller end formed a circle of about 2-3 inches and the larger end formed a circle of about 7½-8 inches. The adjoining edges of the newly shaped funnel were overlapped to form a seam of ½ inch and were pop-riveted in 5 places. Cuts about 2" into the funnel's sides were then made every 1½-2 inches around the small end and the pieces were bent outward to form parallel tabs. This end was inserted into a 10" length of 4" aluminum duct and each tab was pop-riveted to the duct. The same procedure was utilized at the large end of the funnel but the tabs were bent inward until parallel. The tabs can be trimmed of sharp edges and shaped to fit well. This end was then pop-riveted to a 5" wide aluminum ring shaped to a ring size able to snugly accept a 1-gallon carton. A handle (Fig. 1, G) can be conveniently attached with clamp rings (Fig. 1, F, H) to this adapter. The riveted joints were taped to increase rigidity and airseal.

One-gallon cartons and lids (Fig. 1, J,K) were purchased from usual supply houses. The top and bottom were removed and nylon stocking (preferably double knitted) was stretched over the ends and taped. The tape should be 2-3 inches above the bottom of the carton so that it will not interfere when the carton is inserted into the holder.

The mounting bracket (Fig. 1, L) was constructed of perforated angle iron. First, two supporting brackets were made from 17½ inch lengths by notching the angle of the iron 4 inches from one end and bending and welding it at a 90° angle. A 13" cross piece

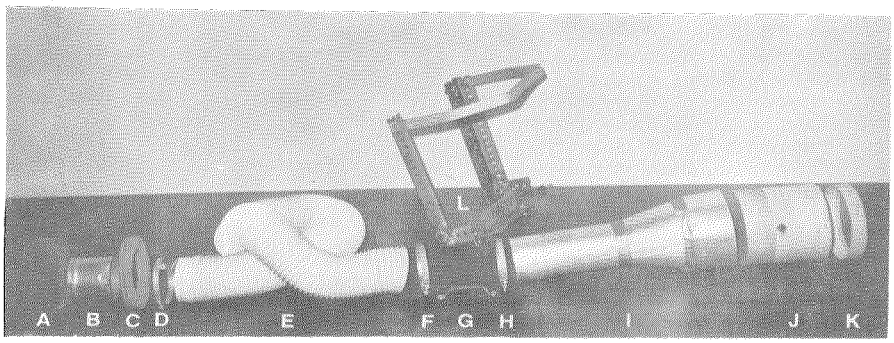

FIG. 1. Unassembled parts of the conversion kit. (A) debris screen; (B-D) adapter and ring clamp; (E) flex hose; (F-H) handle and ring clamps; (I) collection-carton holder; (J,K) collection carton; (L) mounting bracket.

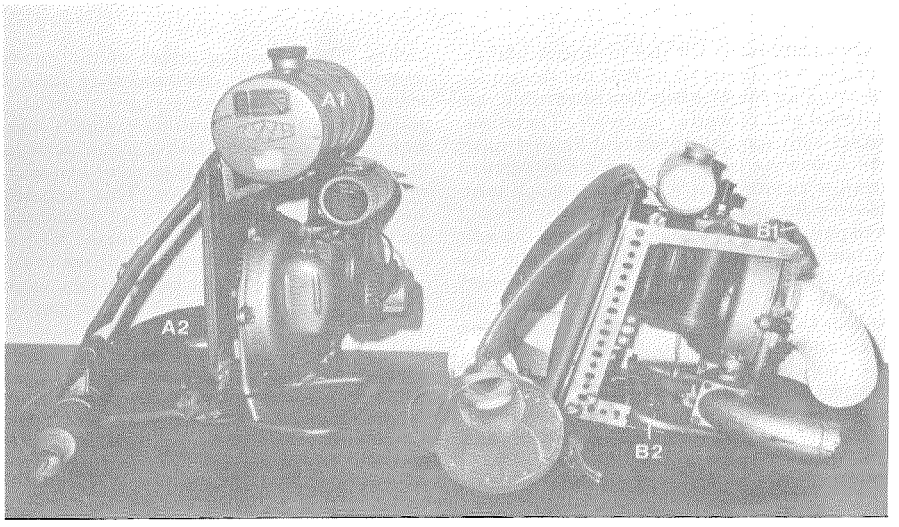

FIG. 2. Assembled (A) mistblower and (B) aspirator.

of the angle iron was then bolted to the ends of the 4" legs. Finally, a metal strap (long enough to intersect the top two bolts on the back of the blower) was bolted to the tops of the brackets.

When converting the mistblower to an aspirator, the operator must remove the tank and sprayer hose and nozzle from the blower (Fig. 2, A1 and A2). The backrest metal panel is then removed and the newly constructed mounting bracket is bolted to the panel. The holes in the backrest used to attach the tanks of the mistblower are used to attach the mounting bracket. It is secured by the upper strap bolted to the blower and by the bottom tubular frame bolted to the mounting bracket (Fig. 2, B1 and B2). This is accomplished by large washers or metal plates holding the tubular frame against the mounting bracket.

The suction apparatus can be set into the intake port and held in place by a flat metal bracket fastened to any one of the unused bolts at the back of the blower. A piece of heavy synthetic screening (Fig. 1, A) is inserted between the wooden adapter and the intake port to prevent debris from entering the machine during its operation.

The time required for the conversion of the mist blower to power aspirator or vice versa requires 15-20 minutes. The unit weighs just over 30 lbs and can be used over extended periods of time without causing fatigue. The weight of the unit is dependent upon the model and brand of mist blower. Figure 3 shows the unit in operation.

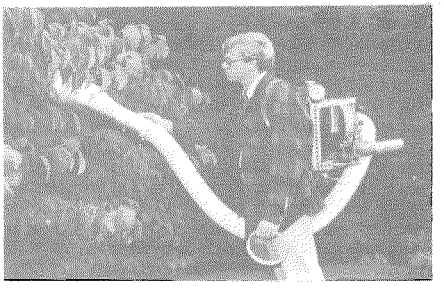

FIG. 3. Aspirator in operation.

TABLE 1. Numbers and species of resting female mosquitoes collected by power aspiration, summer, 1973, at five collection sites.

Mosquito Species	Collection Sites					Total	Number Blood Fed
	1	2	3	4	5		
Aedes canadensis	0	12	6	1	1	20	3
A. cantator	22	313	285	52	91	763	209
A. cinereus	0	1	21	0	0	22	4
A. sollicitans	176	38	51	30	8	303	1
A. triseriatus	0	20	18	22	8	68	11
A. vexans	5	285	206	101	84	681	46
Culex pipiens	0	13	18	1	1	33	16
C. salinarius	0	30	111	18	22	181	45
TOTAL	203	712	716	225	215	2071	335

This aspirator proved to be very satisfactory for our needs. The vacuuming force was easily controlled (approximately ¼ throttle for mosquitoes) and it was possible to regulate the size of the insect captured and held against the screening. The design allows the operator to extract extraneous debris and to examine the catch while the machine is operating. This design also allows the operator to replace the lid without loss of sample if the power were cut, as well as to exchange collecting cartons rapidly. Few damaged mosquitoes were ever discovered as a result of using this aspirator. As with other power aspirators, other species of insects can be selectively collected by varying the force of suction, or by placing different meshed screens in the collection cartons.

During summer, 1973, the aspirator was utilized once or twice a week to obtain samples of resting mosquitoes. Table 1 summarizes the collections obtained by this sampling procedure and attests to the utility of the machine.

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