# Equipment and Techniques of Application

The following pages (111-122) are from the Certification Training Manual for the Structural Pesticide Applicator published around 1975.

Most of the information about equipment operation has not changed. But formulations, packaging, and dosages of pesticides may have. So always follow the instructions printed on the label of **your** pesticide container.

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# EQUIPMENT AND TECHNIQUES OF APPLICATION

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## INTRODUCTION

It might be said that the choice of equipment for pesticide applications is only as efficient as the knowledge of the person using that equipment. In other words, it is imperative that the pest control operator acquaint himself with the limitation of whatever device he chooses, so the ultimate in control can be accomplished. Ignoring this simple axiom causes, perhaps, more failure in the control of pests than any other factor.

The proper maintenance of pest control equipment is almost as important as making the correct choice of equipment for a particular job. Obviously, any amount of expertise is diminished by malfunctioning of equipment. It is not important if the details for repairing equipment is from memory or from a manual that is readily available, if a breakdown occurs. Homemade equipment or devices not considered as standard productive pesticide applicating equipment on the market still must conform to all applicable government regulations. Label instructions with regard to the application of a pesticide usually govern the type of equipment which is permitted to be used.

In order that the information in this publication may be more intelligible, it is sometimes necessary to use trade names of the product or equipment rather than complicated descriptive or chemical identifications. However, no endorsement of *named* products is intended nor is criticism implied of similar products which are not mentioned.

Pesticide applicators utilize many methods in the application of pesticides. Most of these have been developed as the result of years of studying the most effective methods. Some of the methods, however, may result in problems such as over application, not reaching the pest habitat while using a minimum amount of pesticide, and depositing unsafe residues. Proper techniques of application not only aid in effectiveness but also ensure workers' safety, public protection and protection of the environment.

Competence in pest control includes basic knowledge of pests and pest problems, the ability to choose the right pesticide and equipment and a knowledge of proper methods of application. The proper technique of application probably plays a greater part in a successful job than all the others.

The applicator tends to take short cuts in application. He may use too much pressure in power spraying which creates voids in the spray pattern. He may fog when a careful needle point spray directed in the proper place would be more effective. Fancy fogging machines will not substitute for a thorough search of all cracks and hiding places and the application of just the right amount of pesticide with even a crude hand-held sprayer. A brief resume of the types of pesticide equipment and techniques of application is presented in the following section.

## DUSTERS

Dust formulations are pesticides in which the active ingredient is mixed with a substance which is usually light in weight (talc or clay). However, heavier weighted carriers are also essential for the proper distribution in certain situations. Many lightweight dusts are not acceptable in many areas since they may be a hazard to the applicator or the vicinity in which the application is made. Ultimate drift of dispersed dust must be of considerable concern to the applicator. Precautionary measures in the use of dust equipment consist of the following:

1. Because dusts are usually exerted under some degree of pressure, all working parts of the equipment should be carefully examined. All literature provided by the manufacturer should be carefully read.
2. Goggles and respirators should be included in the safety equipment.
3. The operator should be acquainted with the operations and limitations of each piece of equipment he uses.
4. Complete removal of dust remaining in the hopper and any extensions of the duster should be accomplished after the completion of each job.

### Hand Operated Dusters

#### Getz Applicator

This is a very simple device in which a spring is

surrounded by a rubber sleeve sealed at one end by a filler plug and the other by a small release tube (Fig. 100). Contracting the 2 ends compresses the spring and releases a limited quantity of dust through the tube orifice. Releasing the grip on the spring forces the sleeve to resume its original position. The capacity of this device is very small (6 ounces) and usually it is only used for crack and crevice treatment. Small void areas can be expertly treated with this device.

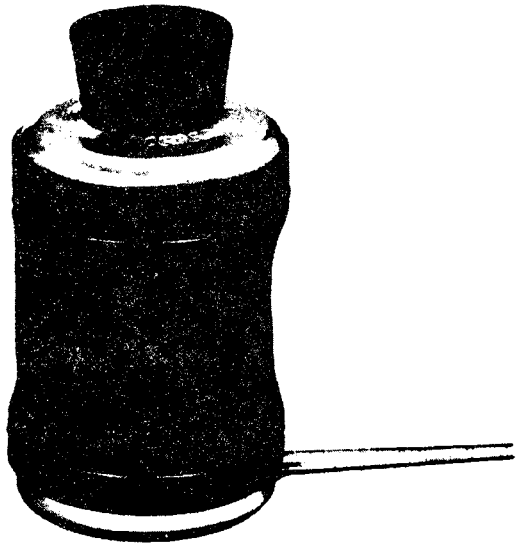

*Figure 1. Getz Applicator*

Flexible Bulb

This is similar to the Getz applicator but does not depend upon a spring to re-establish its flexibility. Instead, by the nature of its construction, it resumes its original shape and upon compressing releases dust through a small orifice (Fig. 1). Depending upon the weight of the dust used, it may hold slightly more than the Getz applicator. Its uses are identical as for the Getz applicator.

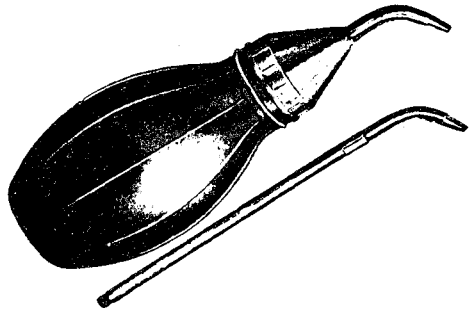

*Figure 2. Flexible Bulb Duster*

Plunger Tube Dusters

This is a device in which a plunger forces air through a cylinder into a small tube of varying length. Retraction of the plunger allows air and dust to mix in the cylinder and upon depression of the cylinder, repeats the above process. This device is suitable for crack, crevice, or void applications. Its capacity is usually greater than both of the previously mentioned dusters.

Hand Crank Dusters

These dusters have a hopper for the dust which varies in capacity from 1 to 10 pounds. At the bottom of the hopper is an orifice which is adjustable in size and which allows the dust to fall into an air stream created by fins attached to a shaft. The shaft in turn is attached to a crank which is driven by hand power. A tube of varying length leads from the hopper to the final area of dispersion. This unit is typically used exteriorly or occasionally under the sub-areas of a house.

Foot Pump Dusters

This is really a duplication of the plunger type duster but in the place of the fixed release tube, a hose is substituted and a place to set the operator foot is provided. The plunger propels the dust through the tube, usually into a rodent burrow. In most cases this style of duster is used in exterior areas.

Power Dusters

As their name implies, the following equipment either uses electric motors, gasoline engines, or compressed air as the power to run the mechanism which propels the dust. Where the hand type units usually are for small applications, power dusters obviously are used where large quantities of dust are to be dispersed. In the structural pest control industry, this type duster is usually reserved for use in large enclosed areas such as attics or sub-areas. However, where necessary and practical, exterior application is in order. Drift hazard and time of application are definite limiting factors in their use.

Electric Motor Powered Dusters

This equipment, as indicated by the name, uses an electric motor which powers the propeller that creates the air to force the dust through an applicator tube (Fig. 2). The hoppers for these dusters usually hold from 5 to 15 pounds. One distinct limiting factor is the necessity for the availability of electricity which, in some instances, could limit the application area.

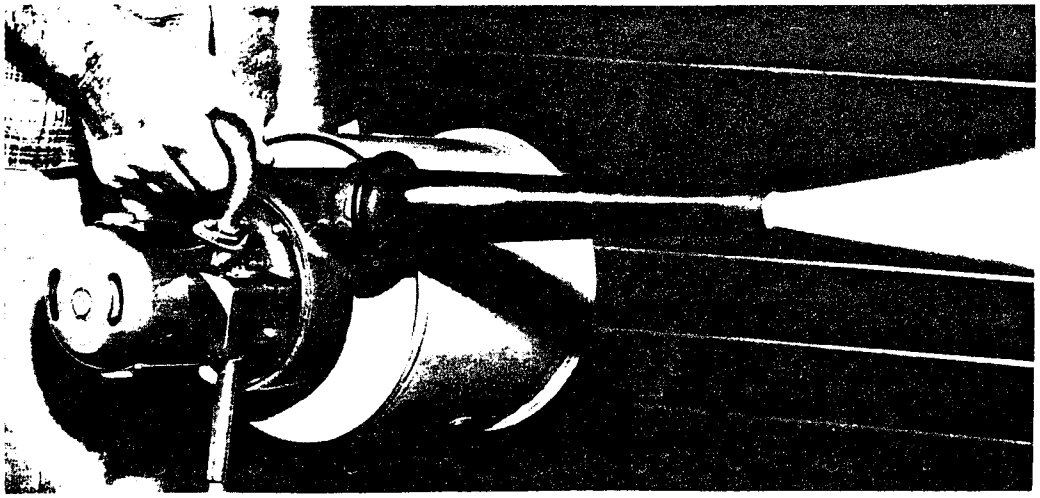

*Figure 3. Power Duster, Operated by Electricity*

### Gasoline Motor Powered Dusters

The most common example of this is the knapsack or backpack duster. However, there are also wheel-mounted units for large scale applications. In this type of duster, gasoline-operated engines accomplish the same effect as outlined above for the electric motor. Particularly with the knapsack or backpack, there is an extremely large area of mobility because the power unit is self-sustaining. Also, many of these units can be used with minor changes for both dust or liquid applications. The hopper in the case of a dust applicator has a capacity of 5 to 25 pounds.

### Air Pressure Dusters

This type of duster is a modification of the fire extinguisher so as to enable the air pressure built up within the tank to expel dust through a hose (Fig. 4). Its limitations are that the quantity of dust is small (1 to 2 pounds) and additional equipment must accompany the unit to build up the air pressure. A truck-mounted air compressor or gasoline facilities also could be used. Once the unit has been filled with dust and pressured with air, it is self-sustaining until either the dust or air is dissipated. Except for the above limitations, it is a very flexible piece of equipment for treatment of cracks, voids, sub-areas, and attics.

*Figure 4. Air Pressure Duster*

## SPRAYERS

There are many ways to classify equipment in this category. The present system is based on the method by which the pressure is originated to force the liquid from any designated holding container.

### Hand Operated Sprayers

#### Flit Gun

This is probably one of the oldest types of sprayers used by the industry. Its basic principle of operation is that a plunger for developing air pressure is situated above a small supply container. As the plunger is compressed, air is diverted through a small hole situated above a syphon tube from the supply container. The stream of air passes over the tube, syphons the liquid from the tank and atomizing it as it reaches the air supply (Fig. 5). Because of tremendous advancements in equipment, this type of sprayer is seldom used today in the structural pest control industry.

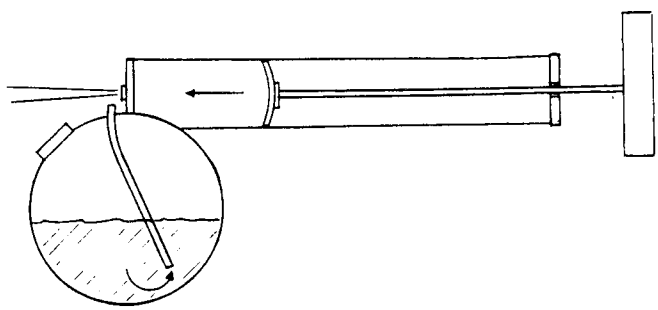

*Figure 5. Flit Gun Sprayer*

#### Small Hydraulic Sprayer

This sprayer is the adaptation of the equipment that used to be used in service stations to spray oil in a pin stream to springs and other lubricated parts of an automobile. It consists of a

small supply container, rarely exceeding a quart. Inserted into this container is a tube enclosed plunger which is connected to a hand-pulled trigger (Fig. 6). By exerting pressure on the trigger, the plunger forces liquid through a tube to an adjustable nozzle. The nozzle can be adjusted from a pinpoint spray to cone shape. Either oil base or stable emulsions can be used in this equipment. More often than not, this sprayer is used to apply a residual insecticide rather than a knock-down formulation. One distinct disadvantage is the small capacity of this applicator. This type of application has few uses for spraying the yard and sub-area.

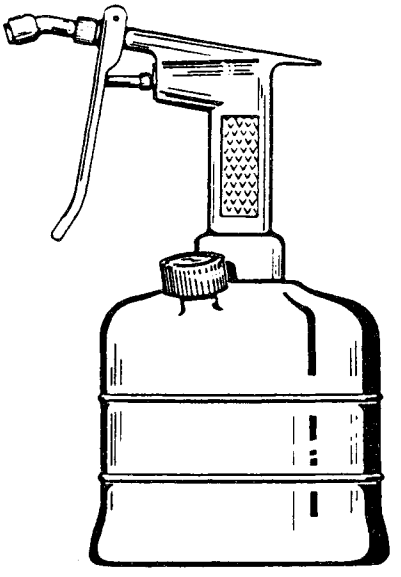

*Figure 6. Small Hydraulic Sprayer*

### Compressed Air Sprayers

This is probably the most commonly used sprayer in our industry. It is composed of a tank (usually holding from one-half gallon to 3 gallons of liquid), a pump to compress air, and a discharge hose with a valve to control the discharge through a nozzle (Fig. 7). Its operation is relatively simple. An airtight tank, preferably stainless steel, is filled approximately to three-fourths of its capacity with a pesticide (Fig. 8). The remaining space is utilized for the compressed air to be generated by the hand-powered plunger type cylinder within the tank. A check valve is located at the bottom of the cylinder to allow the air to enter the tank but closes to prevent the liquid from entering the cylinder. A tube within the tank is located so that its source originates near the bottom of the tank and discharges to a connected hose. Somewhere prior to the nozzle is a hand-controlled shut-off valve. There is usually a pressure valve where the pipe emerges from the tank and the hose connection. The sprayer should not be used with pressures exceeding 50 psi nor less than 25 psi. The nozzle can be either a multipurpose type (pin stream to fan or hollow cone) or a fixed pattern. This type of application is usually confined to inside work and sometimes outside in monthly service calls. Probably the greatest use in this type of application is in cockroach clean-out calls. An electric or gasoline-driven air compressor could be used to generate the air pressure with this type of sprayer. However, this limits the flexibility of the unit.

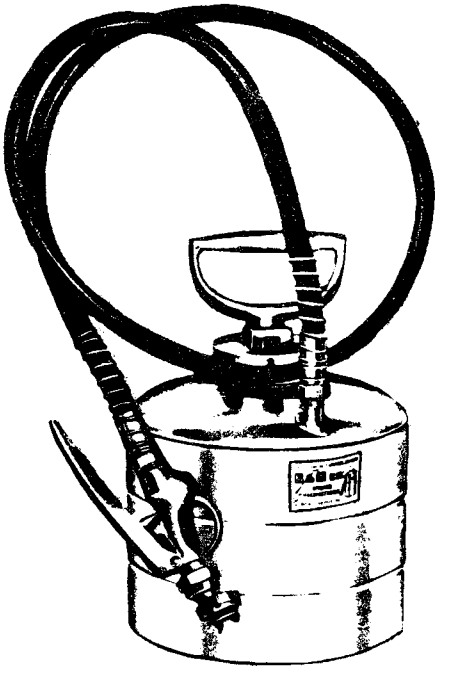

*Figure 7. Compressed Air Sprayer*

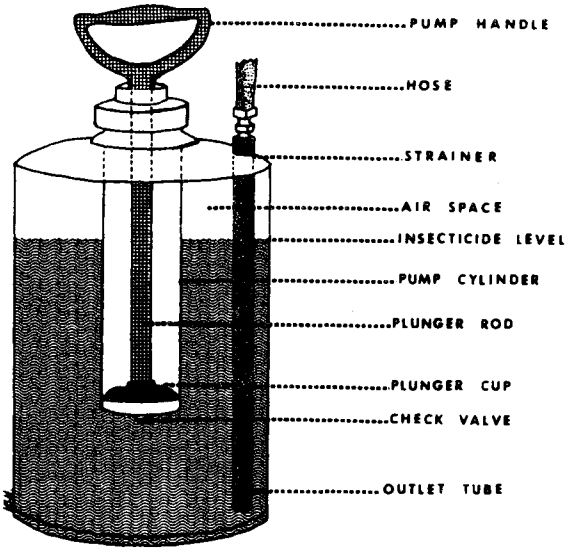


*Figure 8. Compressed Air Sprayer*

**Electric or Gasoline-Operated Sprayers (Powered Spraying)**

For the most part power spray usually refers to the typical 50 to 100 gallon spray rigs owned by most structural pest control firms. Most will have some form of agitation, either jet agitation or blades mounted inside the tank. When spraying either a yard or sub-area, a moderately low pressure with a relatively high volume will aid in a safe even distribution. Where grass or weeds are thick it may be necessary to adjust the pressure upwards to be sure and drive the pesticide down into the soil or turf. However, the spray pattern should be kept coarse to ensure wetness.

Low pressure-high volume is particularly valuable when spraying a dry, dusty sub-area. High pressure tends to ball up the top layer of dust or soft soil and move it around in a sweeping motion, without ever getting the soaking action that is desirable. Needless to say, but some servicemen will use higher pressures to speed up a job. A conscientious applicator will move about with a low pressure-high volume type of application and reach all areas.

With power spraying the source of power is either an electric or gasoline engine (Fig. 9). This power can be transmitted to the pump by belts and pulleys, chains and sprockets, power take-off assemblies, or direct drive. In all cases, the liquid is ejected by the action of a pump through hoses or wands and finally through a nozzle or groups of nozzles. In this industry, the most commonly used type of pumps are the centrifugal, gear, and piston pumps. The selection of a sprayer must obviously be governed by the magnitude of the job.

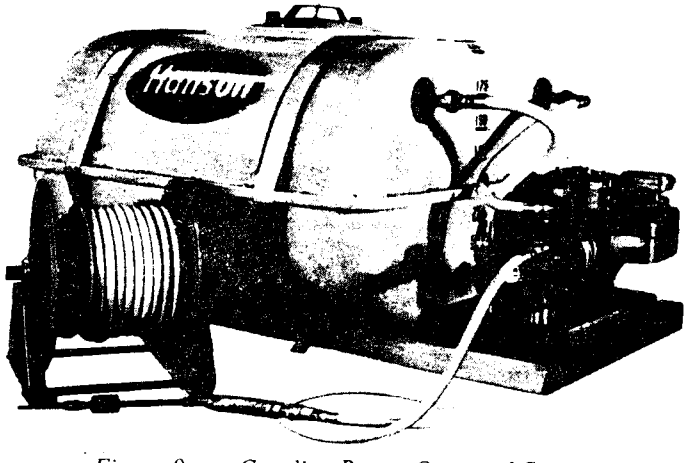


*Figure 9. Gasoline Power Operated Sprayer*

Various types of formulations also play an important part in deciding the tank, pump, hose, regulator or nozzle to be used. The following section indicates the various ramifications of this selection by pointing out the various components of some of the systems now in use.

**Tanks**

They should be of a capacity commensurate with the job. This seems, in most cases, to be of the 50 to 100 gallon capacity. There are tanks available as large as 500 gallons. The tank should be made of either stainless steel, aluminum, fiber glass, plastic, or steel which is coated interiorly with a protective lining or is galvanized. The filling opening should be large, equipped with a strainer, and be of a size large enough to enable easy access for repair of the lining or any mechanical device within the tank. A secure hatch should cover the filling opening to avoid spillage of the formulation while in use. In order for the tank to be adaptable to all types of formulations, it should have a mechanical agitator or a properly placed return of the overflow from the regulator. A drain should be located at the lowest point of the tank and, preferably, should be easily accessible. The inlet to the pump should be of adequate capacity to supply the needs of the pump. An exterior plastic or glass liquid level gauge should be available to check the actual or remaining quantity of pesticide in the tank. All of the newer tanks and liners have been developed to overcome the serious problem of corrosion.

**Pumps**

A pump is the most important part of a spraying system. It is imperative that it be chosen to satisfy the widest range of applications unless its use is for a single purpose. In most instances, the pump comes as an integral part of a complete unit in which the engineering requirements have all been satisfied. In other words, it has been specifically designed and manufactured by a company in this field. As one can imagine, there are many styles of pumps, some specifically for high gallonage delivery with little pressure, while others are styled for both small and large delivered quantities and high pressure. The most common type of pumps are discussed in the following section.

1. Piston Pump

This is one of the most common pumps in existence (Fig. 10). It has the ability to produce large volumes at high pressures; for example, 55 gallons per minute at 800 psi. However, it can also be regulated to deliver 2 gallons per minute at 150 psi. The only feature which makes this type pump undesirable is its pulsating action on hoses and regulators which causes them to wear at a rate

faster than that with other type pumps.

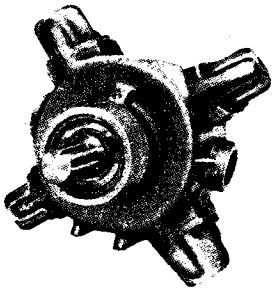

*Figure 10. Piston Pump*

2. Centrifugal Pumps
   This type pump is best noted for its ability to deliver high volumes of liquid at low pressures. These are constructed to handle corrosive and abrasive materials.
3. Roller Pumps
   This is a very popular pump in the industry because of its wide variety of uses (Fig. 11). It has either nylon or rubber rollers and can produce a wide range of volumes and pressures.

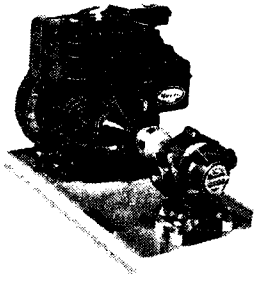

*Figure 11. Roller Pump*

4. Internal and External Gear Pumps
   This is a high pressure pump which produces limited volumes. Although all pumps diminish in efficiency from wear, this is more critical in this specific model.
5. Diaphragm Pump
   This is a low volume pump. The main restriction is relative to using a material which will not affect the material of the diaphragm
6. Flexible Impeder Pump
   A pump restricted to low pressures and limited volume.
7. Vane Pump
   This pump requires materials which afford some lubricating properties.

**Hoses**

The object of any hose is to convey a liquid from the power source to the target. The material of which hoses are made varies considerably. Originally, most were constructed of natural rubber, but today, synthetic rubber, plastic or both are commonly used. As with so many other aspects of equipment in this industry, it is important to know what is expected of the hose relative to performance. For example, is it to carry only oil or water solutions. Are either of these damaging to the center core of the hose? Secondly, under what pressures are the liquids to be carried? Lastly, will the exterior cover withstand normal abrasion? Naturally, such things as capacity of delivery (interior dimension size and friction loss) and material composition of the hose are important in selecting a hose. It is also important to know what specific gallonage delivery is required at the nozzle or group of nozzles. Much of this information is available from the manufacturer, but it should be verified by experimenting with the equipment before it is used. One method of experimentation is to attach the hose to the pump outlet, set the pressure regulator at a specific pressure and attach a nozzle which in turn can be directed into a container. The quantity delivered per minute will determine the gallonage produced by the pump.

**Nozzles**

There are many types of nozzles. Of primary concern is that the specific type provide the pattern desired. In most cases, the pattern is confined to a solid or pin stream, to a fan, or to a hollow or solid cone nozzle (Fig. 12). Many of the above combinations are available in adjustable nozzles. In most instances, the nozzles are made of brass but can also be made of stainless steel, aluminum, or some wearable parts of plastic. Except for nozzles used on small equipment, the gallonage delivered by a specific nozzle, regardless of design, should be clearly known by the applicator. The capacity of the pump, the pressure on the liquid, the friction loss and size of the hose, and the size of the orifice in the nozzle will all govern the ultimate gallonage delivered from the nozzle.

**Strainers**

These are screens made of various materials, preferably stainless steel, which usually are 50 mesh or coarser. They are located at the filling opening, suction line to the pump and at the nozzle tip. Their presence is to prevent any foreign substance access to the spraying system. On the contrary, should they become clogged, they can vitally affect any portion of the delivery system. Routine cleaning is imperative not only for the sprayers to function properly, but is extremely important if the calibrated delivery system is to be accurate

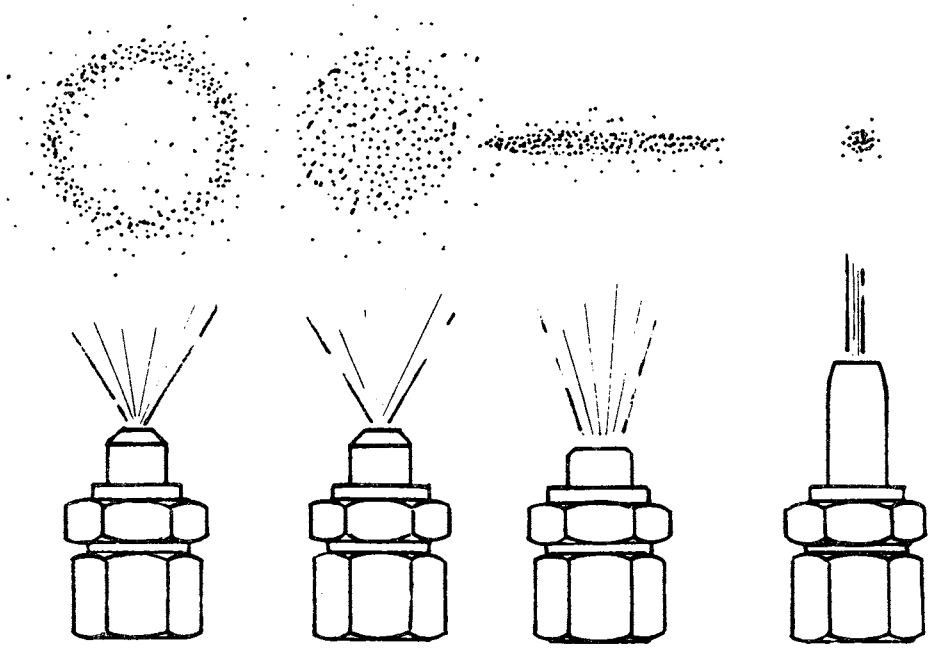

*Figure 12. Diagrammatic Presentation of Nozzles and Spray Patterns. Left to Right: Hollow Cone, Solid Cone, Flat Fan, Pin Stream*

**Valves**

There are many types of valves with some being extremely sophisticated. Their purpose is to shut off the flow of the liquid. Consequently, they are strategically located to be most effective in the advent of an emergency or in the normal function of the shutting off of the supply of liquid. Some have a time consuming screw type shutoff; others, either because of emergency or specific use, shut off instantly. Whichever type is used, frequent inspection to determine their proper functioning is important to guard against any leakage. This inspection is important with regard to maintaining pressures as well as preventing a potential hazard caused by unnecessary drippage.

**Pressure Regulators**

As the name implies, this unit controls the pressure of the liquid being delivered to the nozzle. As with many of the other parts, there are numerous types of regulators. Spring tension which is controlled by a hand-adjusted screw mechanism exerts pressure on the liquid as it flows through the regulator on its way to the nozzle. They can be operated from zero pressure to as high as 800 psi. The indicator or gauge for pressure is located adjacent to or is a component part of the regulator and, as indicated, records the pressure as pounds per square inch. In addition to establishing the pressure, a provision exists for the excess or overflow to bypass the regulator and return to the tank. In many sprayers this return line is located near the bottom of the tank and can be either the primary or secondary measure in the agitation of the spray material in the tank.

**Agitators**

This is a means by which the contents of a spray tank is mixed or agitated. The object is to keep the pesticide in continuous suspension so that it results in an even distribution of the material. In some formulations (wettable powders), mechanical is the only type of agitation that maintains suspension. In this method, a set of paddles is attached to a horizontally located shaft at the lower portion of the tank. Exteriorly, the shaft is connected to the power source. Bypass agitators are a frequently used method of agitation. This technique utilizes the overflow from the regulator to stir the contents of a tank. Obviously, if the nozzle or nozzles are shut off, this system is quite effective. However, if one is utilizing the full output of the pump, very little fluid is bypassing the regulator; consequently, there is very little agitation. Jet agitators are connected to the pressure side of the pump and a supply pipe placed horizontally at the bottom of the tank. The orifice size must be commensurate with the capacity of the pump so that the supply is adequate for it and the nozzle. In all forms of agitators, problems may arise due to the type of the formulation used.

Specialized sprayers utilizing electric or gasoline power which are small and are usually uti-

lized in homes or confined spaces are referred to as space sprayers. They are normally used more with oil formulations than water because of the smaller droplet size generated. The capacity is usually only a few gallons. The droplet size can be extremely small so that it floats in the air for a considerable time or large droplets which allow them to settle quickly.

**Gas Generating Sprayers**

There are essentially 2 types of gas generated sprayers, floating piston type and the very common aerosol spray can (Fig. 13). In the former, a cylinder with a floating piston having nitrogen gas is in one end of the cylinder and the pesticide, which is pumped under pressures of 300 to 1000 pounds per square inch, is in the opposite end. This compresses the piston against the nitrogen and forces the insecticide through a high pressure hose into a very fine orificed nozzle. Although it can be used independently for a limited time, it depends upon a pump situated reasonably close to the job for reloading.

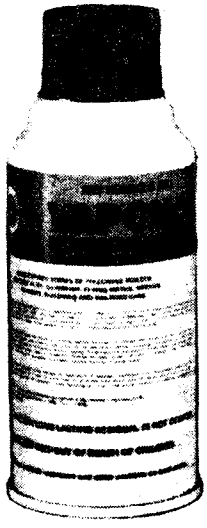

*Figure 13. Aerosol Spray Can*

Aerosol can dispersal of pesticides, although not new, has been very popular both with the public and pest control operators. Their range in capacity, from 6 ounces to 30 gallons, has made them very popular. The small sizes have push type release nozzles while those with a capacity of 5 pounds and up have a mechanical shut-off nozzle. They also come, particularly in the sizes less than 5 pounds, in disposable type containers. Their construction is very simple, consisting of a container in which designated amounts of pesticide and freon are placed. As long as the temperature in the vicinity of the area the material is to be dispersed is warm, the freon will propel the pesticide out of the orifice. The tube leading to the orifice is usually placed such that it reaches the bottom of the container. Aerosol application is generally confined to enclosed areas since the problem of drift is ever present.

## GRANULAR APPLICATORS

As the name implies, this is an applicator for the application of granular formulations. Essentially, these are small hopper type units with an orifice for the material to drop onto the crank operated spinning disc which throws the material over a 15 to 20 foot swath. Also, the same equipment is available in gasoline or power take-off drives which employ the same above principle only on a larger scale. Granules are ready for immediate application. Granular applicators, except in the case of weed control, are rarely used in the structural pest control industry.

## BRUSH APPLICATION

Brush application quite often is recommended on the label for use in areas where a wet application is desired, but care is to be exercised in preventing the movement of a pesticide to non-target areas. This technique is usually confined to application along baseboards, window sills and door thresholds.

## FUMIGANT INJECTION

The only fumigant injection method which might be used by a structural pesticide applicator, other than these described in the section on Fumigation, is local spot injections for the control of drywood termites and wood boring beetles. This technique utilizes a small hand-held $CO^2$ pressurized applicator with a nozzle designed to penetrate into either the small emergence holes created by the insects or into specially drilled holes which open into the galleries. Usually some formulation of ethylene dibromide is used.

## SPOT TREATMENT

Spot treatment is application to limited areas on which insects are likely to occur, but which will not be in contact with food or utensils and will not ordinarily be in contact with workers. These areas may occur on floors, walls and bases or outsides of equipment. For this purpose a "spot" shall not exceed 2 square feet.

**Crack and Crevice Treatment**

Crack and crevice treatment is the application of small amounts of insecticides into cracks and

crevices in which insects hide or through which they may enter a building. Such openings commonly occur in expansion joints, between different elements of construction, and between equipment and floors. These openings may lead to voids such as hollow walls, equipment legs and bases, conduits, motor housings or switch boxes.

U.L.V.

Ultra-low volume application, as defined in agricultrual application, is the spraying of undiluted pesticides in small volume, usually at rates of 1/2 gallon per acre or less. This term when used in structural applications has a somewhat different meaning. It is sometimes referred to as U.L.D. or ultra-low dosage.

The principle of U.L.V. application is the dispensing of a low volume of insecticides over a relatively large area. This is accomplished by breaking the insecticides down into tiny particles. Maintaining the particle size is very important.

## SOIL INJECTION

This technique employs a long hollow, pointed probe connected to a spray rig and a shut-off valve at the top of the injector. It is useful in placing termiticides deep into the soil around the exterior foundation.

## SUB-SLAB INJECTION

This technique is used for treating soil beneath slabs for the control of subterranean termites. This is one of the most useful tools developed for this type work. The sub-slab injector can be adopted to both 1/2-inch and 3/4-inch holes drilled in slab. It has some disadvantages. Among them is the inability to always know exactly the direction of the flow beneath the slab.

| Pest | Application Technique |
|---|---|
| Ants – Inside | Manual spraying to interrupt trails.<br>Brush application.<br>Manual dusting. |
| Ants – Outside | Power spraying – yard and crawl space.<br>Power dusting can be used in crawl space and attics.<br>Thoroughly soak nest of mound building species.<br>Prepared baits can be used. |
| Cockroaches – Food Areas | Crack and Crevice<br>Specially equipped plastic tubes at nozzle end or aerosol crack and crevice applicators are preferred. Keep the tip moving approximately 1 foot per second<br>Do not allow solution to remain on surface surrounding the crack. If dust is used be sure that all dust is brushed into cracks and crevices. |
| Cockroaches – Non-food areas | Manual spraying with fine mist nozzle for residual treatment. Pinpoint nozzle for nesting places. It may be necessary to power spray or power dust for Oriental and American cockroaches as they often infest crawl spaces and basements. It is important that the proper distance from nozzle to surface be maintained to prevent excessive fallout. Also the speed that the nozzle moves is important in order to ensure proper amount of solution being applied in the right place. |

**READ THE LABEL**

| Pest | Application Technique |
|---|---|
| Scorpions | Power spraying with residual insecticide around foundation and entries into house.<br>Manual spraying or brush application around moldings, baseboards and plumbing. |
| Bed Bugs | Manual spraying with fine fan spray for mattresses and pinpoint spray for cracks, moldings, bed springs and other hiding places. |
| Spiders | Door, thresholds, window sills and other entries can be sprayed manually with residual pesticide. Power spraying with wettable powders or emulsions in yards. |
| Ticks | Power spraying or power dusting with residual insecticide in yards, crawl spaces and dog runs. Manual spraying with close attention to baseboards, window casings and under rugs. Sometimes necessary to treat upholstered furniture with fine spray. |

READ THE LABEL

| Pest | Application technique |
|---|---|
| Fleas – Inside | Manual spraying with fine spray around walls, rugs and upholstered furniture. Hand-held misting machines can be used but need only be directed downward. Fleas are seldom found higher than 3 feet in living quarters. |
| Fleas – Outside | Power spraying in yards and dog runs.<br>Power spraying or power dusting in crawl spaces. |
| Bees, Wasps, Hornets, and Yellow Jackets | Blowing of dust with either a good hand-cranked duster or power duster directly into nest.<br>Some baits are effective against yellow jackets. |

READ THE LABEL

| Pest | Application technique |
|---|---|
| Clothes Moths, Carpet Beetles and Carpet Moths | Manual spraying with coarse, wet spray pattern. Residual pesticides with oil or water emulsions can be used. Do not soak rugs with oil-based sprays. Sufficient pressure and volume must be used to drive solution into fiber of rugs and upholstery to reach infestation. Pay special attention to areas next to walls. |
| Stored Food Pests | Manual spraying with residual insecticide in cabinets and shelves. Fine pinpoint spray in cracks. Clean up after drying or put shelf paper down before replacing utensils. Fogging or U.L.V. can be used in storage areas or warehouses. If food is present, use contact insecticides only, avoid contamination. |

READ THE LABEL

| Pest | Application Technique |
|---|---|
| Flies | Space Fogging with knock down spray will help in diminishing the adult population but does not figure as effective measure of control.<br>Power spraying of harborages will prevent breeding to some extent. Fly strips can be used in patios or Bar-B-Que areas. Larvacides applied to infested areas around dairies, chickens or horses.<br>Sanitation is the key to fly control. |
| Sow Bugs, Pill Bugs, Spring-tails, Earwigs, Crickets, Millipedes and Centipedes | Power spraying of all harborages with low pressure-high volume. |

READ THE LABEL

| Pest | Application Technique |
|---|---|
| Silverfish | Manual spraying with pinpoint pattern applied to cracks, behind drawers, molding with residual insecticide.<br>Power dusting of attics may be necessary. |
| Clover Mites | Power spray a band around the exterior of house extending into the yard at least 10 feet and up the walls to window height.<br>Manual spray inside, around edges of windows and doors. |
| Snails and Slugs | Baits scattered on moist ground. Remove dead snails and repeat baiting until control is established. |

READ THE LABEL

| Pest | Application Technique |
|---|---|
| Subterranean Termites in Crawl Space | Power spraying with low pressure-high volume, using persistant termiticide solution. Apply at rate of 1 gallon per 10 square feet of soil area. Apply 2 gallons per 5 lineal feet of foundation walls. If foundation is over 15 to 18 inches deep, apply 4 gallons per 5 lineal feet.<br>Use subsoil injector outside foundation. Do not apply below the top of the footing. |
| Subterranean Termites in Slab Construction | Sub-slab injection in areas where termites appear. |

READ THE LABEL

| Pest | Application Technique |
|---|---|
| Drywood Termites (Localized Infestation) | Inject liquid fumigant in emergence holes or holes drilled to allow entry into galleries. |
| Drywood Termites (General Infestation Extending into Walls) | Complete fumigation with lethal fumigant (see section on Fumigation). |
| Wood Boring Beetle (Localized Infestation) | Inject liquid fumigant into emergence holes. Some beetles can controlled by spraying surface wood to a point of runoff. This may require repeated applications. |
| Carpenter Ants | Locate the nest and manually treat with residual insecticide. |

READ THE LABEL

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