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# AN EXHAUST SPRAYER

## FOR

# GRASSHOPPER DESTRUCTION

By C. F. H. JENKINS, Government Entomologist, and A. R. TOMLINSON,  
Chief Vermin Control Officer

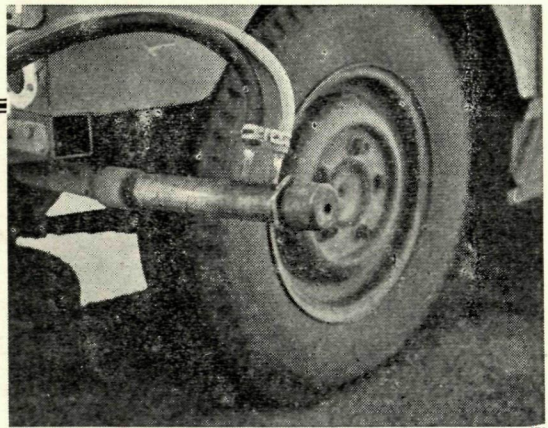


Fig. 1.—The sprayer in position on a Land Rover exhaust-pipe

**S**PRAYING with dieldrin mixtures before the insects reach the flying stage has given excellent results in controlling grasshopper plagues, and the Agriculture Protection Board is supplying dieldrin spraying material free of charge to farmers in the Eastern, North-Eastern and Northern Agricultural Areas.

The application of the spraying material by farmers who did not possess boom spraying equipment presented many problems in the past, but it is felt that this inexpensive, simply-constructed spraying unit operated by the exhaust gases of a motor vehicle may provide a satisfactory method of destroying the pests in the "hopper" stage.

The exhaust spraying unit is an adaptation of a device first used for desert locust control in South Africa and was developed by the South Australian Department of Agriculture for use in grasshopper control in that State.

Following upon the publication of constructional details by F. W. Osborne in the South Australian Journal of Agriculture (Vol. 59 No. 7, February, 1956, pp. 268-270) trial models were made in this State by Malloch Bros. Ltd. who indicated that they would be able to market the units at approximately £7 15s. each.

The home construction of the unit should present no great difficulties to the farmer with access to a well-equipped workshop.

### TEST PERFORMANCES

In tests conducted at Southern Cross by Supervising Vermin Control Officer A. G. Veitch in September 1956, the sprayer operated very well and wiped out a fairly heavy grasshopper concentration.

The sprayer was fitted to a long wheel-base Land Rover which, when travelling at 10 miles per hour in second gear, gave a spray coverage of a strip 9ft. wide. Using a mixture of one gallon of 25 per cent. dieldrin emulsion in 40 gallons of water, 22 acres were sprayed in two hours applying slightly under 2 gallons per acre. The recommended application is  $1\frac{1}{4}$  to 2 gallons per acre.



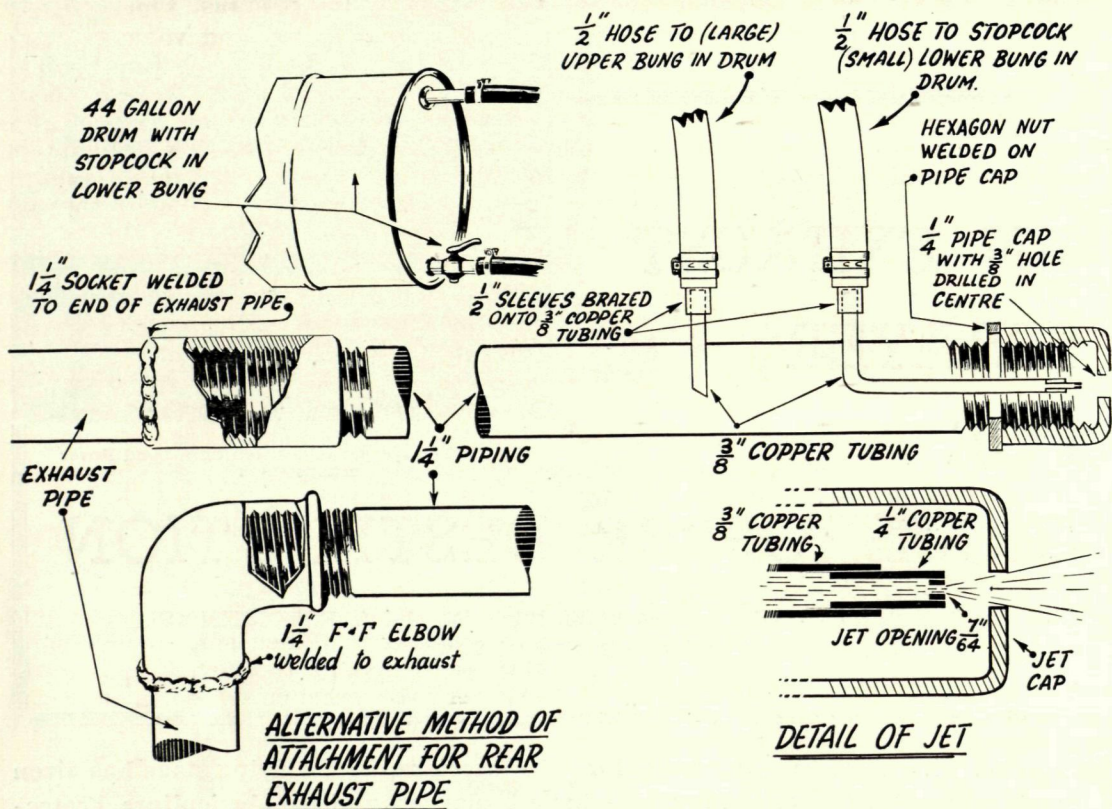


Fig. 2.—Diagrams showing the constructional details of the exhaust spray unit

### CONSTRUCTIONAL DETAILS

The sprayer utilises the exhaust gas pressure of a motor vehicle to atomise spray liquid and distribute it over the ground. It may be operated by any motor vehicle with four or more cylinders.

The spray solution is carried in a 44 gallon drum mounted horizontally on the vehicle. It is fed through a length of  $\frac{1}{2}$  in. hose to a small jet and broken into a spray by the pressure of exhaust gases being ejected through an opening round the jet orifice.

The insecticidal solution is sprayed out at right angles to the vehicle's line of travel and the unit may be clamped to the rear bumper bar or any suitable portion of the vehicle.

### Preparing the Drum.

The drum is placed on its side in the vehicle with the top facing to the rear, and the large bung or plug, uppermost. This large bung is bored and fitted with

a short length of  $\frac{1}{2}$  in. tubing to take a length of  $\frac{1}{2}$  in. rubber or plastic hose. If the large bung is a white metal die-casting, it is preferable to replace it with one made of steel or brass.

The small bung is replaced by  $\frac{1}{2}$  in. stopcock to take a similar length of hose. This tap must be shut off when the sprayer is not in use, as otherwise the spray liquid will leak away through the jet nozzle.

### The Spray Unit.

The body of the spray unit is a length of  $1\frac{1}{4}$  in. galvanised piping threaded at each end. The actual length of the piping will depend upon the type of vehicle used, the position of the exhaust pipe and similar factors.

The  $1\frac{1}{4}$  in. piping is drilled in two places to take two lengths of  $\frac{3}{8}$  in. diameter copper tubing. The one farthest from the jet extends into the centre of the  $1\frac{1}{4}$  in. piping and has a length of  $\frac{1}{2}$  in. tubing brazed to the outside end to take the length of hose extending to the upper or large bung on



the drum. This allows sufficient gas pressure from the exhaust to build up in the drum to maintain a steady flow of solution from the lower bung.

The other length of copper tubing is bent at right angles inside the  $1\frac{1}{4}$ in. piping and extends to the outer end. A short length of  $\frac{1}{4}$ in. copper tubing brazed into the outer end of the  $\frac{3}{8}$ in. copper tubing constitutes the jet. It should project  $\frac{1}{2}$ in. beyond the end of the  $1\frac{1}{4}$ in. piping and should have the orifice reduced to exactly  $7/64$ in. in diameter. The other end of the tube also carries a  $\frac{1}{2}$ in. tubing sleeve connected to a length of  $\frac{1}{2}$ in. hose running to the stopcock.

A  $1\frac{1}{4}$ in. pipe cap—or a  $1\frac{1}{4}$ in. socket with one end closed by a welded-in disc—is used as a jet cap. This cap has a  $\frac{3}{8}$ in. hole in the centre to provide an outlet for the exhaust gases, and spray droplet size is adjusted by screwing this jet cap in or out. For ease of adjustment a  $1\frac{1}{4}$ in. hexagon nut is welded to the cap. The best results are obtained by adjusting the jet cap to give the maximum outlet for exhaust gases. If screwed down too far, it restricts the escape of the gases to such an extent that too much pressure may build up in the drum.

When the spray unit is not in use, this jet cap is removed and replaced by an ordinary open-ended  $1\frac{1}{4}$ in. socket. This allows the exhaust gases to escape freely and protects the jet.

## Connecting to the Exhaust Pipe.

In the Land Rover and vehicles which have the exhaust pipe projecting at right angles to the line of travel, a  $1\frac{1}{4}$ in. socket welded on to the end of the exhaust pipe is all that is needed for the attachment of the spray unit, although suitable clamps may be needed to support the unit and prevent undue vibration.

Where the exhaust pipe points to the rear, a  $1\frac{1}{4}$ in. F.F. elbow can be fitted with or without suitable reducing sockets, according to the size of the pipe.

## OPERATING HINTS

As the filled drum weighs about 4 cwt. some bracing of the floor of the vehicle may be necessary.

The slower the road speed of the vehicle, the more liquid will be applied per acre.

The engine revolutions must be kept high enough to ensure that the spray output is adequate. When going down hill it may be necessary to change to a lower gear. A little practice will soon overcome these difficulties.

The spray jet orifice must be kept at exactly  $7/64$ in.—no smaller and no larger. Any alteration will influence the effectiveness of the spray.

**It is important to ensure that the exhaust system of the vehicle is free of leakages from manifold to the tail of the exhaust pipe. Even a small leakage will greatly reduce the efficiency of the spray unit.**

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