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That's why your Jacobsen distributor goes out of his way to offer you the best service in the business. From normal maintenance to emergency repairs.

And he's been going out of his way for a long time. Our distributors have been with us for an average of 25 years. And their service managers have been with them for an average of 11 years. That's one heck of a lot of experience.

But Jacobsen distributors don't rest on laurels. Every year they send their service managers and key people to our Racine Product Training Center for comprehensive training sessions.

To stay up-to-date on new products and modifications.

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Not only that, Jacobsen distributors hold field seminars and offer training to those customers who handle their own routine maintenance.

Fast service. Done by professionals who are thoroughly trained.

That's what you said you expect.

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Next time you get a chance, ask your Jacobsen distributor to tell you about his service philosophy.

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We hear you.

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TEXTRON

Jacobsen Division of Textron Inc.

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Equipment *from page 30*

A line strainer, or suction hose and strainer, is necessary to prevent rust, scale, and other foreign particles from damaging the pump and clogging the nozzles. For most emulsifiable chemicals used, a screen of 100 mesh should go in the line strainer and nozzles. If wettable powders are used, so should screens of 40 or 50 mesh to allow unrestricted flow.

The chemical package label of a pesticide usually recommends the proper pressure for spraying. Low pressures of 30 to 40 psi are usually sufficient for spraying herbicides or spreading fertilizer, but high pressures up to 400 psi may be needed for spraying insecticides or fungicides.

Since nozzles are designed for a certain pressure range, they must be used as such to get the proper application rate. Higher pressures increase the delivery rate, reduce the droplet size, and distort the spray pattern, which results in spray drift and uneven coverage. Lower pressures reduce the spray delivery rate and the spray material may not form a full spray pattern. A minimum pressure of at least 20 psi is usually necessary to produce a good spray pattern with most nozzles.

Agitator

Another item that must be considered before selecting the power package for a sprayer is the need for agitation. Liquid concentrates, soluble powders, and emulsifiable liquids require little agitation. But to keep wettable powders in suspension so that the chemicals will not settle out, causing the application rate to vary, requires intense agitation. This comes by means of a separate agitator, either a jet type or mechanical.

A jet agitator operates by a return pressure line hooked into the system directly behind the pump and should be positioned in the tank to provide agitation throughout. For a simple orifice jet agitator, a flow of 6 gpm per 100-gallon tank capacity is usually adequate. There are several types of suction venturi attachments available that help stir the liquid with less flow. With these, the agitator flow from the pump can be reduced to 2 or 3 gpm per 100-gallon tank capacity.

A mechanical agitator with a shaft and paddles will do an excellent job of maintaining a uniform mixture, but is usually more costly to install than a jet agitator.

Pump

Those who use their sprayers for several different kinds of spraying—herbicides for different weed control problems, insecticides, or fertilizers—face the need to change nozzles or noz-

Continues on page 36

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zle placement, to provide more agitation, increase ground speed, or apply chemicals at higher rates. Often these changes result in a need for a different or larger pump.

A sprayer pump must have sufficient capacity to operate the agitators as well as to supply the nozzle requirements. In fact it is recommended that the pump capacity be 20 percent greater than the sum of these requirements for the largest volume sprayed. This will allow for sufficient capacity if the pump wears and loses some strength.

If you plan to buy or build a sprayer, it's a good idea to anticipate what applications you may be using it for to determine the proper pump. Often, a pump works fine for two different jobs. For example, Myron Koistinin, applications engineer for Hypro, a Div. of Lear Siegler, Inc., says: "For lawns and trees, you can have a small spray boom that you can pull with a garden-type tractor and in addition have a hose reel that's set up on the trailer frame and a handgun to spot spray trees." Yet, he adds, if you use a field sprayer which requires relatively low pressure, it may not interchange for the high pressure needs of a tree sprayer.

The pump parts should resist the corrosive and abrasive effects of chemicals so that if wear or damage does occur it can be serviced easily. Other things to consider are pump cost, pressure requirements, ease of priming, and power source available.

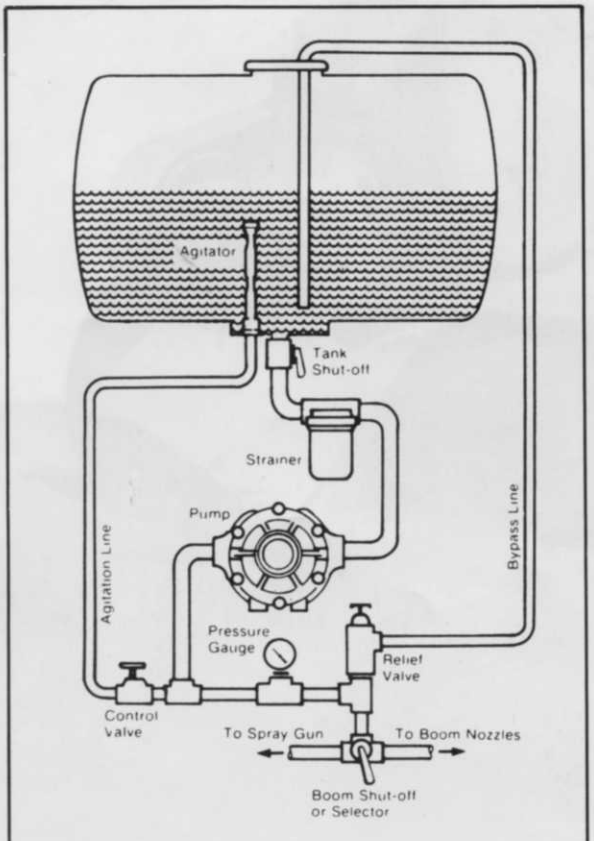


Figure 1. Roller pump system.

Most of the pumps used on weed and pest control sprayers are of three general types:

1. Roller or rotary pumps with rolling vanes
2. Centrifugal pumps
3. Piston pumps

Roller pumps have enjoyed wide popularity due to their low initial cost, compact size, easy repairability, and efficient operation at tractor PTO speeds. Moreover, their volume and pressure ranges are adequate for most spraying jobs.

A slotted rotor in the pump revolves in an eccentric case and the rollers move in and out radically to seal the spaces between the rotor and the wall of the case. As the rollers pass the outlet port, these spaces contract again directing the fluid out. Pump capacity is determined by the length and diameter of the inside case, its eccentricity, and the speed of rotation. The pressures produced by roller pumps will range to 300 psi and capacity at low pressures will range up to 300 gpm.

Roller pumps come with cast-iron or corrosion-resistant housings and nylon, Teflon, or rubber rollers Nylon rollers have proved to be the most resistant to chemicals and are recommended for multi-purpose sprayers. Sand or scale in the chemical being pumped is very abrasive to the rollers. Roller pumps should have factory-lubricated ball bearings, stainless steel shafts, and replaceable shaft seals. If bearings contain a grease fitting, do not overgrease them to cause damage or bearing failure.

Figure 1 shows the recommended hookup for roller pumps. The control valve is placed in the agitation line so the bypass flow is controlled, which will regulate the spraying pressure.

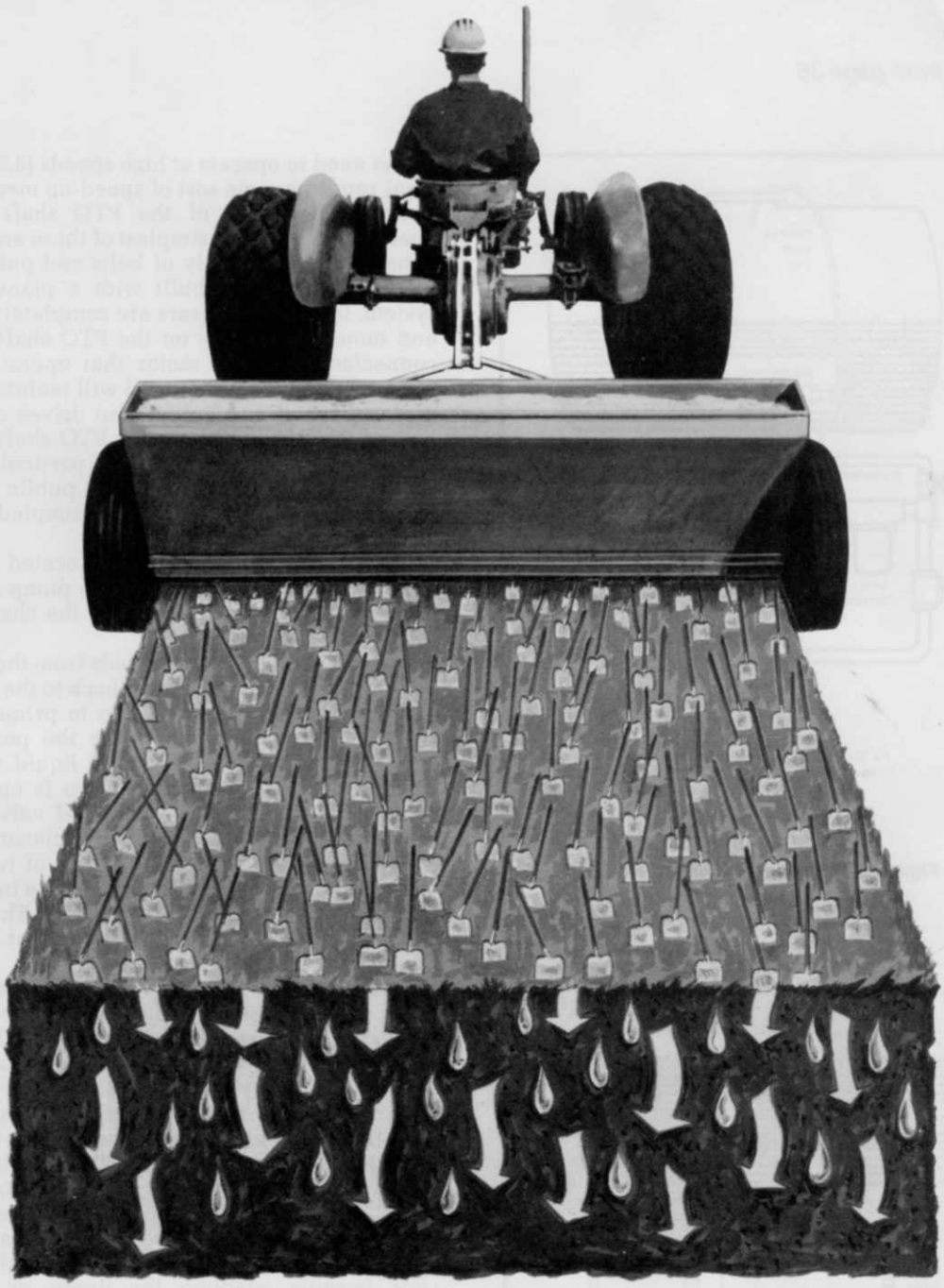
To adjust the system, close the control valve and open the boom shut-off valve. Start the sprayer, making sure flow is uniform from all spray nozzles, and adjust the relief valve until the pressure gauge reads about 10 to 15 psi above the desired spraying pressure. Slowly open the control valve until the spraying pressure is reduced to the desired point. If the pressure will not come down to the desired point, replace the agitator nozzle with one having a larger orifice. If insufficient agitation results when spraying pressure is correct and relief valve is closed, use a smaller valve for the same pressure.

Roller pumps are usually installed directly on the tractor PTO shaft. Anchor the pump to the tractor with a chain. This will allow the pump to move and reduce wear on the bearings if any misalignment exists.

Centrifugal pumps have become increasingly popular in recent years. They handle wettable powders and abrasive materials very well and their high capacity (70 to 130 gpm) provides plenty of volume for operation of hydraulic agitators in the tank.

They are capable of developing pressures up to 170 psi, but volume falls off rapidly about 30-40 psi. This steep performance curve is an advantage as it permits controlling pump output without a relief valve. However, high sensitivity to speed and inlet pressure variations makes for uneven pump output under some operating conditions.

Continues on page 38



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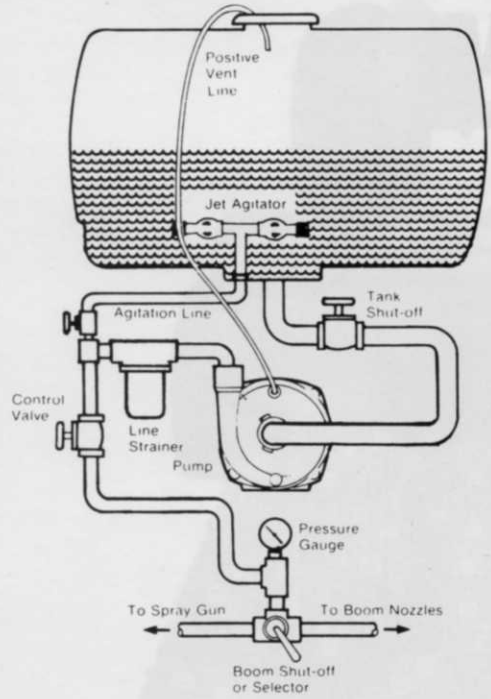

Figure 2. Centrifugal pump system.

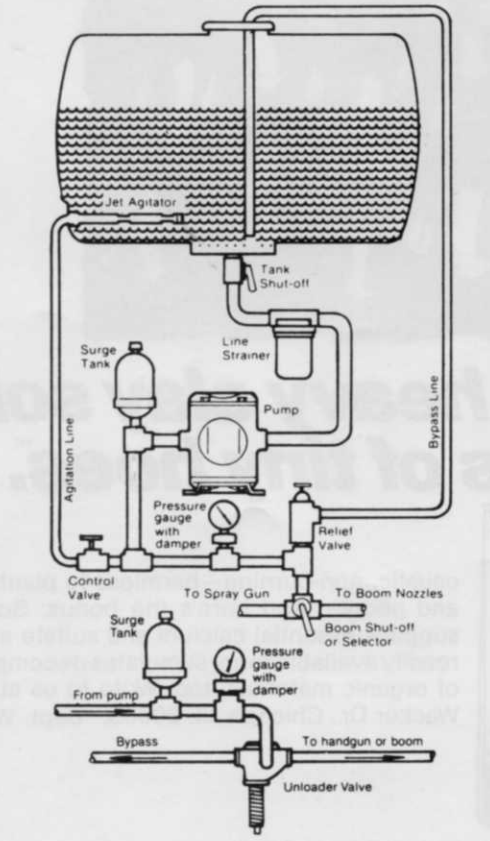

Figure 3. Piston pump system.

The need to operate at high speeds (3,000 to 4,500 rpm) requires some sort of speed-up mechanism to convert the speed of the PTO shaft to pump operating speed. The simplest of these and least expensive is an assembly of belts and pulleys.

Some pumps are built with a planetary gear system, in which the gears are completely enclosed and mounted directly on the PTO shaft. A direct connected hydraulic motor that operates off the tractor hydraulic system and will maintain a more uniform speed and output also drives centrifugal pumps. This frees the tractor PTO shaft for other uses. On some larger sprayers, particularly those used for applying herbicides on public lands, the pumps are driven by direct coupled gasoline engines.

Centrifugal pumps should be located below the supply tank to aid in priming the pump and maintaining a prime. Figure 2 shows the changes from roller pumps.

A small plastic vent tube leads from the top drain opening in the pump housing back to the tank. This positive vent allows the pump to prime itself by bleeding off trapped air when the pump is not operating. The small stream of liquid that flows back to the tank when the pump is operating is usually of little concern. No relief valve is used, since the pump is not a positive displacement type.

The final modification is the use of two control valves in the pump discharge line, one in the agitation line and one to the spray boom. This permits controlling agitation flow independent of nozzle flow.

To adjust for spraying, open the boom shut-off valve. Start the sprayer running and open the control valve to desired spraying pressure. Then open the agitation line valve until sufficient agitation is observed. If spraying pressure drops, readjust the control valve to restore desired pressure. Make sure flow from all nozzles is uniform.

A piston pump is a positive displacement pump, which means that its output is proportional to speed and virtually independent of pressure. It works well for wettable powders and other abrasive liquids. Either rubber or leather piston cups permits adapting the pump to water or petroleum based liquids and a wide range of chemicals. Lubrication of the pump is usually not a problem.

Piston pumps, although more expensive than other types, are dependable, highly adaptable, and have long life.

Larger sized models have capacities to 25 gpm and develop pressures to 600 psi. They usually require a surge tank at the pump outlet to reduce line pulsation.

Figure 3 shows the connection diagram for a piston pump. It is similar to a roller pump, except that a surge tank has been installed at the pump outlet. A damper in the pressure gauge stem reduces the effect of pulsation. When pressures above 200 psi are used, the relief valve should be replaced by an unloader valve. This will reduce the pressure on the pump when the boom is shut off.

Continues on page 41

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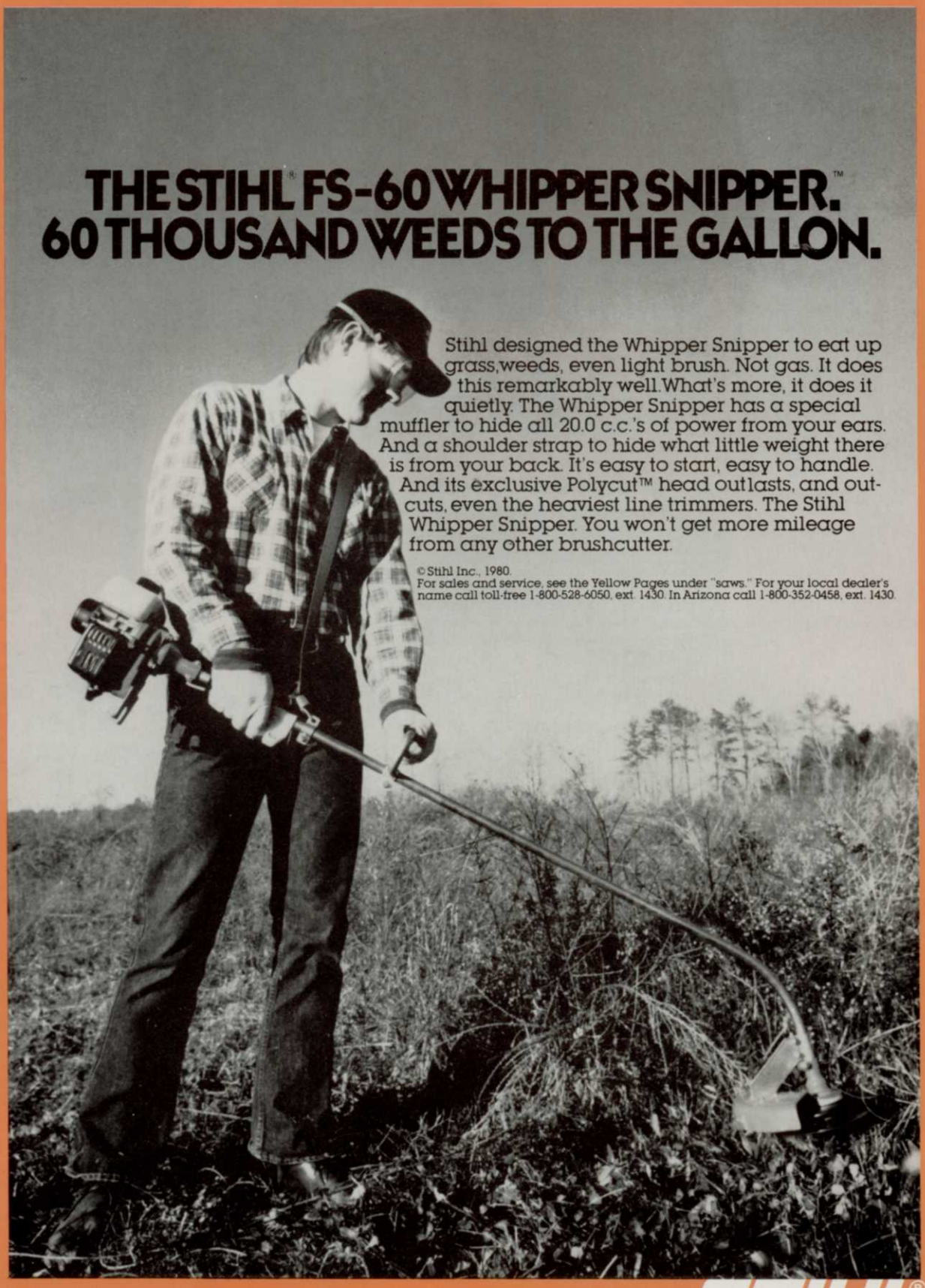

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