

HYDRAULICALLY - OPERATED GLASSHOUSE VENTILATORS

By J. A. CEDERMAN, Orchard Instructor,
Department of Agriculture, Kaikohe.

SEVERAL types of equipment are used in glasshouses to operate the opening and closing of ventilator systems: They range from single levers fitted to individual ventilators to more complicated mechanical gear capable of operating entire ventilator systems of large glasshouses. The latter type is often difficult to operate, costly to install and maintain, subject to mechanical breakdown, causes unnecessary shading, and takes up a significant part of a busy grower's time each day. A hydraulic system fitted and operating successfully in a large glasshouse at Otaki, which is described in this article, appears to have much to commend it.

THE hydraulic equipment was made and installed by the patentee, a registered plumber of Otaki. The equipment, which is fitted in a glasshouse 100ft. long by 30ft. wide, operates the opening and closing of 27 large ventilators alternating along the top ridge of the house.

The working of the ventilators is controlled from 4 water taps fitted at one end of the house. Two taps are connected to a $\frac{3}{4}$ in. pipeline from the water main and operate the opening of the vents on their respective sides of the house. Two further taps, connected to an overflow pipe, control the closing of the vents. Above the control system each pipeline is reduced to a $\frac{1}{2}$ in. copper pipe extending the length of the house.

The base of the small hydraulic cylinder is connected by a small piece of steel to a 2in. steel strut bolted between the rafters under each ventilator. The top of the cylinder or cylinder rod, which operates the lifting or lowering of the ventilators, is attached to the higher portion of the centre board of each ventilator about 6in. from the ridge blade of the house. A 6in. length of $\frac{3}{4}$ in. high-pressure hose connects the copper pipeline to the base of each cylinder. The cylinders, which are copper with brass pistons, have floating rubber washers the same size as the chambers at the base of pistons.

The only unusual feature about the ventilators is that they are connected at their base by a piece of 2in. x 1in. timber. This facilitates even opening and closing.

How System Operates

A water pressure of from 15 to 30lb. to the square inch is required to operate the system. The turning on of a tap at the end of the house forces water from the pipeline through the connecting hose into the cylinder chamber, the cylinder rod is forced up, and the ventilators are opened simultaneously to the desired height. The turning on of a second tap releases the water within the cylinder, which passes to an over-flow sump and the ventilators are partially or completely closed as desired. Two identical taps operate each side of the system.

The movement of the ventilators is instantaneous with the turning on of the taps; when tested the ventilators moved from closed to fully open in from 10 to 12 seconds and required from 5 to 6 seconds to close.

At present the equipment is fitted to the top ventilators only, but the designer can see no reason why the side ventilators could not be operated also. It is considered that a complete glasshouse unit of several houses could be connected and operated from one set of control taps, as each cylinder operates individually and the overall load is not increased by an increase in the number of ventilators.

The cost of the equipment, though fairly high at present, may be reduced considerably if cylinders are manufactured in large numbers. Maintenance costs should be negligible, as there is no strain on the working parts and the equipment is all rust-proof.

With a hydraulic system any number of ventilators can be operated speedily and simply. This should ensure better control of humidity and temperatures within glasshouses and a corresponding improvement in plant growth and disease control. There is no strain on the house structure as is imposed by the operation of mechanical equipment. The reduction in maintenance costs and the daily saving of labour are also appreciable.

The water pressure in any normal water supply system is sufficient to operate the hydraulic system.



The ventilators fully opened.