

or stop spraying at will. Details of construction are shown in the accompanying picture.

A tankful of water was sprayed over part of the rough with the tractor traveling at normal speed and the pump operating at 150 to 175 pounds pressure. The area covered was measured. It was found that 100 gallons would spray two acres. Subsequent operations were based on using 50 gallons of water per acre, or about half the quantity normally used in the Chicago area. Arsenic acid was the weedkiller employed on the roughs.

Crude arsenic acid is a heavy liquid, almost twice as heavy as water (specific gravity 1.7 to 1.8). The ordinary grade contains 70 percent arsenic acid. It comes in 12 gallon glass carboys, which are used for sulphuric and other acids. An acid siphon is best for transferring arsenic acid into smaller bottles or jugs. Siphons can be obtained from most chemical supply houses, and from many automobile accessory jobbers. Arsenic acid is a poison and will produce serious flesh burns. It must be handled carefully.

One-half gallon of crude arsenic acid was used per acre, or about 7½ pounds (2¾ ounces per 1,000 square feet). It was less than the 11 pound rate per acre (4 ounces per 1,000 square feet) used by some greenkeepers in Chicago. The contents of a 1-gallon jug were added while the tank was being filled with water and the 100 gallons were sprayed on two acres. The cost per acre for material was less than \$1.00 for each treatment.

Blue grass can withstand a relatively heavy dose of arsenic acid, especially when cut longer, as is the case in the rough. Turf discolors badly, but the grass will recover, provided the soil is not too dry at the time of spraying.

The roughs have been sprayed five times, twice in the fall of 1944 and three times in the spring of this year. Spraying started last fall in late September, and ended in late October. The interval was approximately three weeks. The spring of 1945 was an unusually early one. Midsummer temperatures prevailed in March. Weeds started off with a rush. Plantain and buckhorn plants of the year before were killed completely by the two fall treatments. The reduction in dandelions was marked, but a considerable number still remained. Spraying was resumed in late April but flower buds were far advanced on many dandelion plants, so some seedheads formed despite the spraying.

In the future, spraying in the spring will start when the first flower buds appear in the crown of the plant.

By mid-June there were few weeds left. Players had no trouble this year finding golf balls, even though the roughs were

not cut short, because the weed foliage and seedheads were gone.

Verhalen is so enthusiastic about the improvement in the roughs that he intends to do some spraying every year. He realizes weed control is not a one year proposition, because new weeds keep coming each year from seed in the soil. Besides reducing the weeds, he says spraying at the proper time eliminates all the seedheads which reel-time mowers do not cut. The mowing problem is simplified too, because the arsenic acid checks the growth of blue grass temporarily. When the roughs grow too fast to be kept in check with the mowers, spraying burns the weeds and slows the growth of grass.

Arsenicals help control grubs also. Serious damage does not occur after a program of spraying for a year or two. Arsenic acid and sodium arsenite give control at far lower concentrations than lead arsenate. Grubs are responsible for bad weed infestations on many roughs. They kill the blue grass and then weeds develop from seeds already present in the soil. To kill the existing crop of weeds is only the first step in any weed control program. Unless a cover of grass is obtained and maintained, there will be another crop of weeds in a year or two. The battle to curb weeds is a continuous one. The time may come when a little fertilizer will be used occasionally on the roughs to maintain the grass cover.

Announcement of a new weedkiller, called 2,4-D for simplicity, was made in 1944. It received wide publicity. Results being obtained with it are very promising. When used correctly, it appears to be far better for dandelion, chickory and several other weeds than the arsenicals. Apparently it has a definite place in the weed control program, but may not entirely supplant the arsenicals on golf course turf. Spraying with a combination of 2,4-D and arsenic acid or sodium arsenite might give a better and quicker kill of the weeds, besides grubproofing the roughs and curbing growth of the blue grass during the spring and fall. Whether the idea is a good one and workable is a matter for time to tell. In any event, it is apparent that big things are in the offing for weed control, but herbicides alone will not supplant the necessity for employing other practices which are essential in the maintenance of dense turf capable of resisting the invasion of weeds.

**WESTCHESTER TOPS MILLION INCOME**—Westchester CC, Rye, N. Y., had gross income from operating departments of \$1,163,950.75, and net operating profit of \$118,093.69 for year ending Dec. 1944, according to president's report and audit recently issued.