

it is well to know that an area of 18 fairways averages about 51 acres, one acre containing 43,560 square feet. Therefore, to irrigate an acre to the same extent as an inch of rainfall it would require the equivalent of 43,560 square feet times  $1/12$ , or 3,630 cubic feet of water. This is equal to 3,630 cubic feet times 7.48 gallons per cubic foot, or 27,152 gallons per acre, subsequently the average one-inch coverage for a six-fairway watering, which is about the number of fairways watered by the latest system at one time, would require about 480,000 gallons.

In view of the fact that the supply is satisfactory in quantity delivered through piping of sufficient size and with a suitable pressure at the sprinkler heads, the fairway can be watered so as to obtain a satisfactory growth of turf, but where the water supply is insufficient or piping too small or pressure too low, a proper application of water becomes so difficult as to render irrigation uncertain. Many examples of insufficient water supply are found on golf courses with such inadequate piping as to prevent the water being applied either economically or satisfactorily. Piping a golf course is an art in itself involving questions of pressure and other technical matter which must be worked out by an expert.

Florida and California have advanced irrigation engineering and the newly constructed courses in these states are being equipped with the newly designed hoseless water system throughout the fairways and tees. This system is a three-valve control, each valve controlling six fairways at a time and requiring only one man to operate it. The sprinkler heads are flush with the ground level and are spaced throughout so that they cover the entire fairway thoroughly in one operation.

Gravity systems are used chiefly, but there are also a number of high-pressure pumping systems requiring 300 pounds pressure at the pump for the proper coverage. The average golf course requires about 30,000 feet of piping and is the most economically maintained when hose and sprinklers can be avoided. This system has promises of extending eastward. That, coupled with the installation of fertilizer solution tanks for distribution of sulphate of ammonia in one operation will be the last word in golf course irrigation and fertilization of fairways.

## Watering Fairways

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THE most necessary requirement in watering fairways is knowing when to start watering. A good soaking rain penetrating about three inches will carry the fairways about ten days, after which time they begin to show signs of scorching. After the first week in June, one cannot depend on regular rains, so it is necessary about three days after a rain to start watering, as it takes from seven to eight days to completely water the fairways on an 18 hole course.

I purposely do not use the word sprinkling, as there usually is a tendency to just *sprinkle*, and not water. The soil should be soaked to a depth of three inches, which will keep the fairways in good condition until the cycle of the course has been made.

The system I use to determine the depth the water has penetrated, is by using a pointed stick, about two feet long, which the men carry with them, this being very necessary at night as the men cannot see how far the sprinkler has covered.

When watering the fairways, the men work 24 hours a day in 12 hour shifts.

The type I use has proven very satisfactory, three of them having been in use for five years.

These sprinklers throw 90 gals. of water a minute, and cover an area of 80 feet in diameter.

It usually takes about 20 min. to get a sufficient amount of water to penetrate the required 3 inches. On high spots which dry out more rapidly, the sprinkler is left 30 minutes, the amount of water distributed is 1,800 to 2,250 gals., so one can readily see what is meant by watering. Of course, it is necessary to have good pressure, say, from 65 to 75 lbs.

The water main should not be less than six inches to maintain this pressure. An elevated tank of 100,000 gals. capacity is necessary, also a reservoir or pond where the water can be aereated and warmed, as cold water has a tendency to check the root action of the grass. Pressure tanks are not practical, being underground their water is always too cold.

Hydrants with two inch outlets, installed every fifty yards are needed for each fairway, so that the fairway can be watered with a minimum amount of hose. A

