

Course Watering System

Features Described

By WENDELL P. MILLER

(Part Two)

Classification of Turfed Area Irrigation Methods

THESE are five methods of turfed area irrigation, of which four are artificial, viz:

- 1—Rainfall.
- 2—Hose Systems.
- 3—Hoseless Systems.
- 4—Open ditching and flooding methods.
- 5—Monitors or hydraulic "Giant" systems.

The hoseless systems can be further classified between:

- 3A—Portable Sprinkler.
- 3B—Fixed Sprinkler Systems.

The portable sprinkler hoseless systems can be still further divided between:

3A—(1) Snap valve or individual sprinkler control system.

3A—(2) Plain quick couplings with a single valve controlling batteries.

The fixed sprinkler hoseless systems can be grouped as follows:

3B—(1) Underground, concealed, or "pop-up" systems.

3B—(2) Above ground—fixed position sprinklers.

There are odd methods ranging from street water carts used in emergencies to the overhead garden piping systems; but these odd methods are of little use for turfed areas. Group 4 would include the loose-underground-tile method but this truck garden method has not proved satisfactory for turfed areas.

Open Ditch and Flooding Method

This method is used only in western irrigated agricultural regions, and is rapidly disappearing—piped systems are coming in. This method has very limited application due to the special conditions required. Anyone interested in this method need only to visit the Phoenix (Ariz.) C. C.

Monitor or Giant Method

This method is of very recent development (1929-1930) with three installations

(polo fields at Cleveland, Toledo and Colorado Springs). The monitor method has no immediate application to golf, yet because of its numerous possibilities we shall describe it.

Briefly, the monitor is a high pressure universal mounted-nozzle of the type used on fire trucks. This same nozzle is used for surface stripping in mining operations, on gold and other dredges, and in many other industrial applications.

The standard polo field is 450x900 ft. with a margin around it. Five and four, or five nozzles on each side, and staggered, are used. The nozzles are permanently placed inside wooden stake guards, 200 ft. apart and twenty-five feet back from the side boards. Each nozzle is mounted on a full universal mounting, limited in depression to 15° above the horizontal. Only one nozzle is operated at a time.

Terrific Pressure Used

The operating pressure is 300 to 350 pounds, throwing 350 gallons per minute over a range of 250 ft. The breakup is excellent. Each nozzle must be located so it can cover the ground around its neighboring nozzles. Each nozzle puts out one-half inch of water in about 30 minutes.

One man can irrigate a 10-acre polo field in a few hours. This method is best adapted to flat ground—or if slightly graded then only on loose, porous, soil. The run-off on tight soils can be minimized by using each nozzle for a few minutes and going the rounds several times.

Future applications of this novel method will be for airport and industrial area dust control, and old-fashioned cemeteries where the monument congestion has necessitated hand sprinkling. Perhaps you will see the monitor on the golf courses of the future. It is too early to prophesy.

Monitor System Installation

A four-stage pumping plant is required costing, with automatic control and pump-



Giant high-pressure nozzle in action on polo field at Colorado Springs

house, at least \$6,000. If a permanent installation is required special grades of expensive pipe are required (six inch mains with four inch risers). High grade workmanship and highly technical detailed plans and specifications according to best hydraulic engineering practice are required. A complete system for one polo field, not counting cost of wells, etc., will run from \$10,000 to \$15,000 according to grade of pipe and class of pumping equipment. Polo field irrigation is a necessity—and this method is admirably adapted to the purpose, hence we may look for numerous installations of this system on American polo fields.

Having mentioned the methods which are side issues, we will dismiss them from our discussion. Rainfall (1) will be discussed separately in connection with water requirements.

Hose Methods: Tees and Greens

Every reader is familiar with hose irrigation and more especially with "watering" lawns. Most readers of GOLFDOM are familiar with tee and green irrigation systems of their golf courses which are identical with lawn systems. Convenient outlets are placed near the tees and greens, and lawns. Large hose (one inch) is customary. (This size would be large for lawns where five-eighths inch garden hose is commonly used. A few clubs use three-quarter inch hose. Every kind of sprinkler made is used on the tees, greens, and lawns.

These systems, characterized by small sizes of pipe, high friction losses, and by cheaper grades of pipe are of little value for fairway watering for several reasons namely, (1) inconvenience of location, not having been planned for extension, (2)

water supplies wholly inadequate for fairway requirements.

Standard green and tee practice requires a minimum size of one and one-half inch wrought iron pipe (or equivalent grade) at the extremities of the system, 60 pounds or more pressure at the farthest outlet, one inch hose, quick detachable hose connections (outlets) and specialized golf course sprinklers with a range of 100 ft. or more and distributing from 15 to 25 gallons per minute. The average tee and green system uses 25,000 gallons of water per day (California, Florida, Long Island and several other places use more). Often two men are required on the night sprinkling shift for 18 holes; these are frequently supplemented by sprinkling of tees early in the morning. Most tees and greens are over irrigated and the water stomach-ache is a common ill.

But few clubs are equipped according to the standards mentioned. Fewer systems still can be extended into fairway systems—and just as few are designed so that fairway watering can be installed without complete abandonment of the existing facilities. The average club does not even bother to have on hand a map of its water and drainage system. If there be one outstanding feature in connection with the more than 4,000 tee and green irrigation systems of the United States it is the almost complete failure to plan for expansion into fairway irrigation.

This, however, is easily explained. The tee and green irrigation is the first irrigation investment of each club and as the funds never meet all purposes, the watering systems are the simplest, plainest, and usually the cheapest, that will serve. New clubs are usually more concerned with struggle for life than with providing for

their future. As maturity is reached and ambitious competition develops newer desires, the expansion of the existing systems into fairway irrigation becomes a major problem.

Fairway Hose Irrigation

Fairway irrigation is spreading. The current irrigation projects runs 95% to the method calling for the smallest plant investment—hose irrigation. This proposition will, however, change when financing is available because underground sprinkling equipment has reached an advanced stage of development. This fairway hose systems are an extension of the tee and green idea. Convenient outlets are placed in the rough along the fairways. Various types of outlets are used, mostly with one inch hose in 100 ft. lengths. Many of the green sprinklers and numerous novelty sprinklers are used on the fairways.

Fairway systems require from 200,000 to 300,000 gallons (more in California, Florida, Long Island, Argentina, etc.) of water every 24 hours during extreme drouths. The tee and green piping systems cannot carry any such volumes of water, hence a special system of large size mains is required.

Hose Fairway Systems

Standard practice requires looped piping systems with water fed to the outlets from two or more directions through permanent pipe not smaller than three inches (and not much of that size—a minimum main of four inches is desirable) with quick coupling outlets spaced not over 120 ft. apart; one inch hose in 100 ft. lengths with quick attachable couplings;

60 pounds, or more residual pressure at the farthest outlet; and sprinklers which cover an area of not less than 8,000 sq. ft. (seven settings per acre).

Systems of this type, wholly apart from the tees and greens, and without the pumping plant, can be installed for \$15,000 to \$25,000 dollars according to location of water supply, grade of pipe used, and whether winter drainage or a winter-proof system is desired.

The outstanding characteristic of hose fairway systems is the high labor and supply operating expense. Usually an 18-hole club can profitably pay interest on the extra cost of a hoseless system to secure the savings inherent in the latter method.

In Plate One we show a portion of a hose fairway system illustrating method of looping and location of fairway outlets.

Hoseless Fairway Systems

Hoseless systems are just what the name implies. The requirements of the hose fairway systems are observed except that a slightly high water pressure is desirable, particularly in the fixed sprinkler types. Each outlet of the hose system arrangement is extended onto the fairways through underground pipe laterals terminating in fixed outlets in the fairway turf. These outlets present no obstruction to the mowing equipment and none worth mentioning to the players. The outlets are only three inches in diameter: ground rules permit the player to move his ball when too close. The better installations, pressure from 70 to 100 pounds, run from seven to ten outlets per acre. The better California courses—perhaps 50 or more enjoy hoseless irrigation. This method

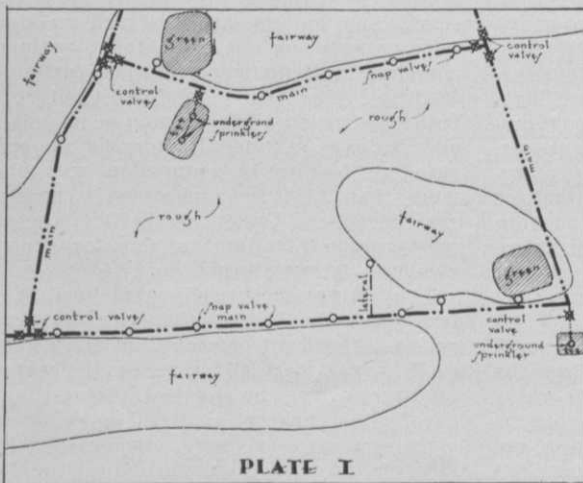


Diagram of a typical fairway watering system designed for hose coupling from convenient outlets in the rough.

originated in California where the aridity of soil and climate and the genius of Joe Mayo, Pebble Beach greenkeeper, combined circumstances to produce the first effective installation of all-hoseless fairway irrigation—hence the name "California System."

The outstanding characteristics of the hoseless system are: first, perfection of coverage and, second, low cost of operation as compared with hose systems. These systems are not common east of the Sierras, not because they are not needed, but because they are not understood.

Portable Sprinkler Type

At this writing all of the hoseless systems, with one or two exceptions, are of the portable sprinkler type—that is, the fairway outlets are quick connecting and are used in connection with sprinklers which are attached to quick "couplers" which are inserted in the "snap valves" as needed. (Note: The earlier California systems use ordinary pipe outlets).

Individually Controlled Valves

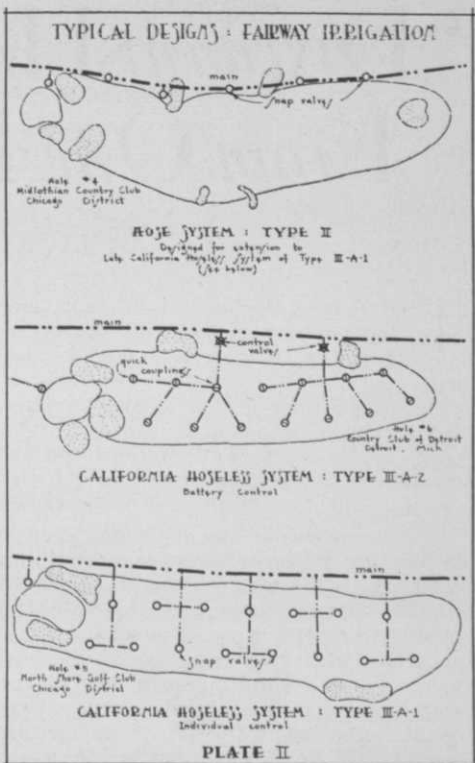
The more recent of the hoseless systems use a type of snap valve in which the insertion of the sprinkler coupling into the valve automatically opens the valve and permits the water to flow. This system can be seen in operation almost anywhere in California and at the North Shore and South Shore Country clubs, Chicago.

In operating these systems, the greensman starts out with a load of sprinklers, attaching them where needed. When all are attached he starts over, removing the sprinklers and moving them to further locations in rotation. He does not get wet, because the sprinklers throw only one or two streams, revolving so slowly that he can keep out of the way. The distribution of water is more uniform than can be obtained from the use of portable hose sprinklers. Plate Two (bottom) illustrates a fairway of the North Shore Country club, Glenview, Ill., showing the arrangement of the outlets.

This type of system is good but not ideal. The outstanding characteristics of the individually-controlled, portable-sprinklers-fixed-outlet system are first, good water distribution and, second, low cost of operation compared to hose systems, also the certainty with which the greenkeeper can place water exactly where he wants it.

Battery Controlled Hoseless Systems

Battery control, while considered by some owners to be better than the indi-



dual control system, is the forerunner of the latter method. In the battery method, each fairway group of from three to ten outlets is controlled by a valve in the lateral and near the main. The water is not turned on by inserting the sprinkler in the coupler. The hand valve in the lateral turns on the water for the entire battery of sprinklers at one time. The sprinklers are of the same kinds as used in the individual system and are handled in the same manner.

The main advantage of the battery method is that it is trouble proof. The fact that all of the outlets in the battery must be used at once is an apparent rather than a real disadvantage.

This system has all the advantages of the individually controlled sprinkler system, plus the outstanding advantage of freedom from trouble. It requires the least care and attention of all fairway hoseless irrigation systems except the underground or concealed sprinkler systems.

Next month, this series of articles on watering will be continued.