SPRINKLER DEVICES

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YESTERDAY, TODAY, & TOMORROW

I. Sprinklers of Yesterday

In 1933, Rain Bird built the first spring-actuated impulse sprinkler. Prior to the mid to late 1970's, water seemed plentiful and energy was very inexpensive. There was no concern to conserve energy, therefore pivot and sprinkler pressures ran anywhere from 80 psi (pounds per square inch) to 100 psi. The main focus was to throw the water as far as possible. Engineers conducted tests and determined that the optimum angle for a sprinkler, to get the largest diameter of throw, was 27 degrees.

Lower angle sprinklers were used before the late 1970's, most of those irrigation applications were oriented to something else other than pivots. In the late 1970's, pivot manufacturers were designing pivots with spacings closer than 40 feet. The lower the angle of the sprinkler, the smaller the diameter of throw the sprinkler will have. The lower angle sprinklers caused spacings to very between manufacturers from 8 feet to 34 feet. Therefore, different types of lower angle irrigation devices could be designed to accommodate the new spacings.

II. Sprinklers of Today

During the 1980's, sprinklers under went many changes. Probably the biggest advancement in pivot sprinklers was to plastic. Low angle impact sprinklers went as low as 6 degrees in trajectory, with the common maximum spacing of 20 to 21 feet. These sprinklers were designed to ran at a regulated or end pressure of 20 psi.

With energy cost increasing, irrigators were wanting to decrease costs and yet hold the

line on, or even increase, yields if possible. Pivot pressures were dropping and a desire for more energy efficient sprinklers increased. With lower pivot pressures, it is more critical to have an even distribution of water. Therefore, presenting a need for flow control devices.

A pressure regulator is a flow control device that has a preset pressure rating and is designed to only kill excess pressure. A pressure regulator is recommended for 2 reasons: (1) When the main line pressure is higher than the maximum operating pressure of the sprinklers. (2) When the approximate end pressure of the pivot (psi), on the level, is less than half of the total elevation difference from the high point to the low point (feet).

Due to inflation costs, a low cost sprinkling device was needed. A sprinkler of lower cost and possibly more efficient is the spray head. This stationary sprinkler has a common maximum spacing of 10 feet and able to run at a regulated or end pressure of 6 psi. The spray head has different optional deflector plates that could be used: (1) A coarse groove for large droplets, reducing wind drift and evaporation, although soil compaction and erosion could be most prevalent with this plate. (2) A medium groove plate for intermediate size droplets. (3) A smooth, non-grooved, plate for small droplets, which reduces the amount of soil compaction and erosion, but is more susceptible to wind drift and evaporation. These three plates are also available in a concave, flat, and convex trajectories. When used on top of the pivot, the concave plate will throw the water back down toward the ground. The flat plate will throw the water out horizontal to the ground. The convex plate will throw the water up towards the sky.

Also in the 1980's, more systems had drops installed on them. At first, the drops were primarily made of galvanized pipe. Other drop materials, that came along later in the 1980's, included polyethylene, 16 gauge galvanized pipe, aluminum, PVC, and flexible hose. With the advancements in sprinklers came the desire to go to drops.

The LEPA (Low Energy Precision Application) idea and concept was basically "fathered" by Dr. William M. Lyle, professor at the Texas Agricultural Experiment Station from Lubbock, Texas. The LEPA concept, which is designed to be highly efficient, includes such requirements of a system as:

a. capable of conveying & discharging water into a single crop furrow.
b. discharging water very near the soil surface to negate evaporation.
c. operating with a main line end pressure no greater than 10 psi when the end tower is at the highest point is the field.
d. resulting in zero runoff from the irrigation water application.
e. resulting in rainfall retention which is demonstrably greater than conventionally tilled and managed systems.

Three sprinklers that are used on drops and throw farther than spray heads are the Senninger Wobbler and the Nelson Rotator and Spinner. The Senninger Wobbler was around in the 1970's on top of pivots, but is now restricted to being used on flexible hose drops with Wob-loops. The Wobbler is designed to operate between 10 to 40 psi. The Nelson Rotator is designed to operate either on top of the pivot or on any type of drop. The operating range is 15 to 50 psi, depending upon plate selection. The Nelson Spinner is designed primarily for drops and operates from 10 to 20 psi.

These three sprinkler were designed with 3 basic criterias in mind. (1) Be able to operate at pressures similar to spray heads. (2) Be able to throw farther than a spray head, widening the application band, therefore reducing the instantaneous application rate and the possibility of erosion. (3) Be able to operate on drops, to get the water being applied closer to the crop and soil surface, to decrease evaporation potential.

III. Sprinklers of Tomorrow

As of 1993, research is being done on using drip emitters and drip hose in corn. At this time, it is a cost probihited way to irrigate. Some areas of the country are now in situations that they are being limited to the amount of water they can use. New water rights, in the Garden City, Kansas area, are limited to pumping only 25 inches of water over a 5 year period. A corn crop requires approximately 15 inches of water per year. This means with a little help from mother nature, new Garden City irrigators may possibly grow a corn crop 2 out of every 5 years. How about the other 3 years? With the help of universities, professors, extension agents, and etc., it may be possible to raise 180 bushel corn using drip irrigation. By using drip irrigation, there is no evaporation and no runoff. Possibly with this method, when water becomes even more scarce or very costly, the irrigators in western Kansas may grow a corn crop every year.

Have you ever noticed how a lot of things on the television, that are cartoons that pertain to the future, seem to eventually come true? For instance, take Dick Tracy's wrist watch, a visual telephone, which may be purchased today for a premium. Or how about Bullwinkle and Rocky flying to the moon? I can't wait for the day when I can transport home just like they do on Star Trek. Some cartoons today show domes over cities, imagine in the future a dome over your field to control your own atmosphere and make it rain whenever you want it to. Whatever we dream today, no matter how silly it may be, could be the future.

Sprinklers of Tomorrow? Now if I knew the answer to this question, I would not be selling sprinklers in the irrigation business.

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