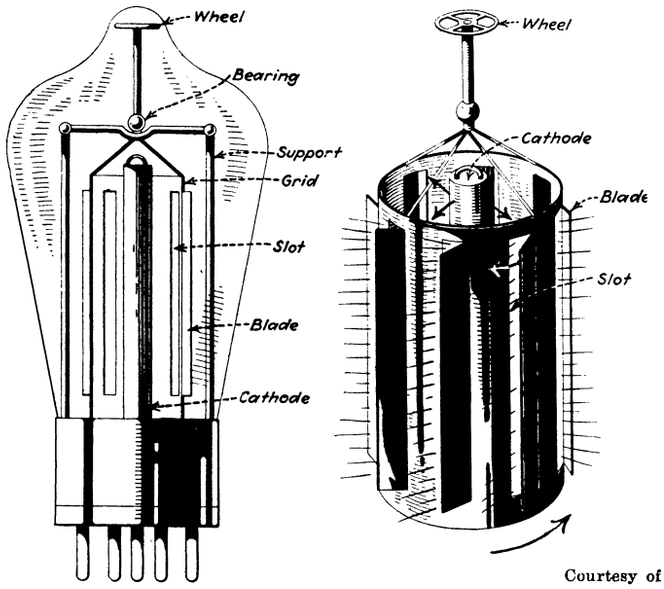
Electrons Run Motor In Vacuum

Electronics

Improvement on Crookes' Windmill-Like Device



Courtesy of *Electronics*

The bottom arrow indicates the direction in which the electronic motor is turned by electrons which fly out from the cathode in the center.

A MOTOR that runs by a stream of minute electrons is the latest modification of the vacuum tube that makes home radio sets possible. In the current issue of *Electronics,* this tube, the invention of Allen B. DuMont, chief engineer of the DeForest Radio Co., is described.

In the center of the DuMont tube is the filament, immediately surrounded by a cylindrical cathode, from which the electrons emanate. Around the cathode hangs a cylindrical grid, suspended from a bearing at the top so that it is free to turn. In the grid are a series of vertical slots, with small blades projecting from one side of each of the slots. All the blades point in the same direction.

As the filament is turned on, the electrons are shot out from the cathode at a high speed, and after passing through the slots in the grid they hit the blades and bounce off to the outside. The impact of each electron is very minute, but with the great numbers that hit all the blades there is sufficient force to start the grid rotating.

No practical use has yet been found for the tube, as the power developed is very small. It has been suggested that it might be used for a clock, however, or as a source of alternating current.

Some years ago the famous English physicist, Sir William Crookes, who was one of the original experimenters with cathode rays, or streams of electrons, used them to produce a rotary movement. In one of his cathode ray tubes, the stream of rays was aimed at a small windmill-like device in the tube, and the windmill spun round very rapidly when the tube was operating. But this tube required high voltages to operate it, while the DuMont tube will work on voltages of the same order as used in radio equipment.

Science News-Letter, August 30, 1930

Irrigation, a Throwback of Civilization

Soil Science

PRESENT-DAY irrigation and dry farming constitute, in a way, a return to the ways of our earliest civilized forbears. Civilization originated in the semi-arid lands of the world, and only after the lapse of centuries did farming leave such places as the valleys of the Nile and the Euphrates and reach its greatest development in the moister, cooler lands of the temperate regions. Now we are again paying attention to the lands of little water, using methods that are basically the same as those of the earliest farmers but with the advantages and improvements that can be derived from modern science.

This is one of the points brought out in a review of principles and methods of soil utilization, presented at the Second International Soil Science Congress by Sir John Russell, head of the great agricultural experiment station at Rothamsted, England, the oldest institution of its kind in the world.

The two principal means of gaining a profit from warm lands of little rainfall, Sir John pointed out, differ radically in their methods and in their results. The first, which dispenses with artificial watering, devotes itself mainly to the support of grass crops, either as grazing lands producing principally wool, or as dry-farming areas producing cereals. The second, which uses irrigation, is too expensive for staple food production except in such lands as Egypt where the object is more to keep the population alive than to realize profits. Elsewhere irrigated lands are given over primarily to specialized, high-price crops, such as fruits.

The soil problems of dry-farmed land are quite different from those of the more humid regions. In ordinary farm lands organic matter in the soil is counted indispensible; it is not found so in dry-farmed lands. More than 25 per cent. of clay in a moist region condemns land as untillable and consigns it to the category of permanent pastures. In arid regions the clay content may run as high as 50 per cent. without destroying the tillability of the soil. Nitrogenous fertilizers are not so necessary on dry lands as they are on moist, but sulphur and sulfates are often effective.

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