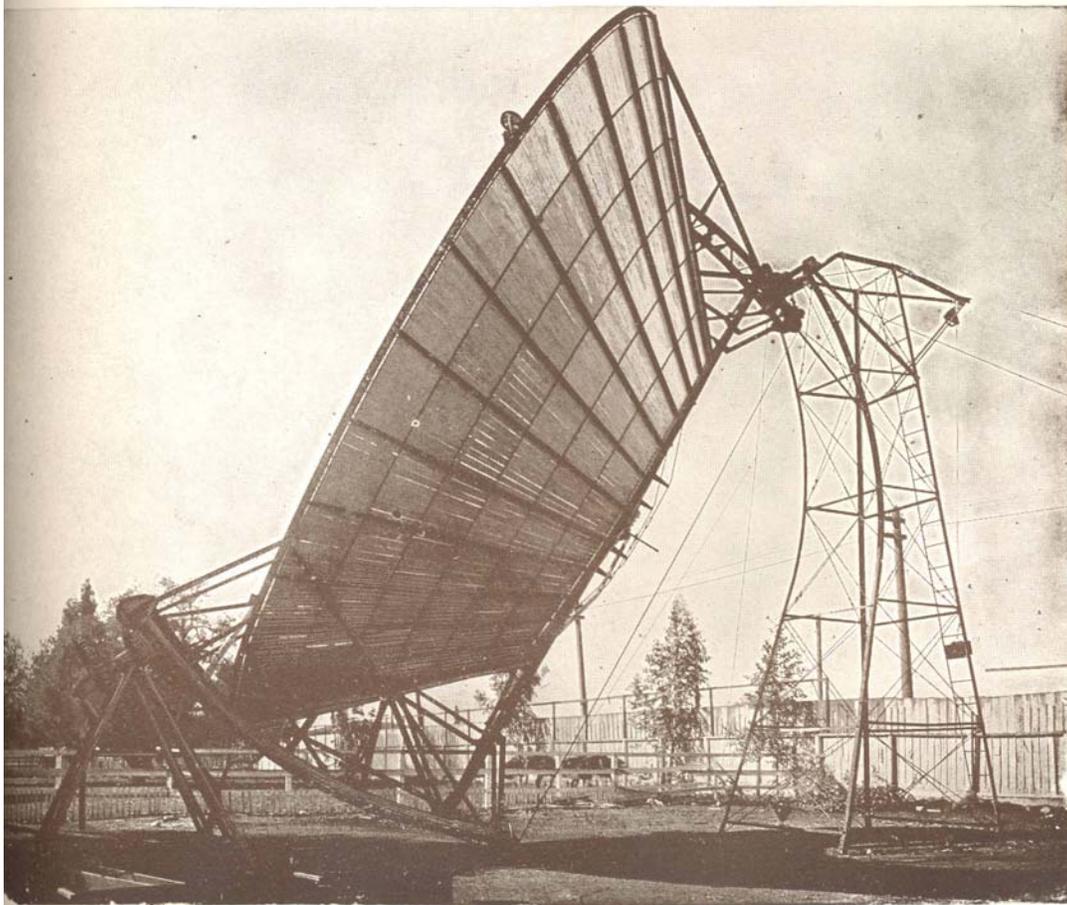
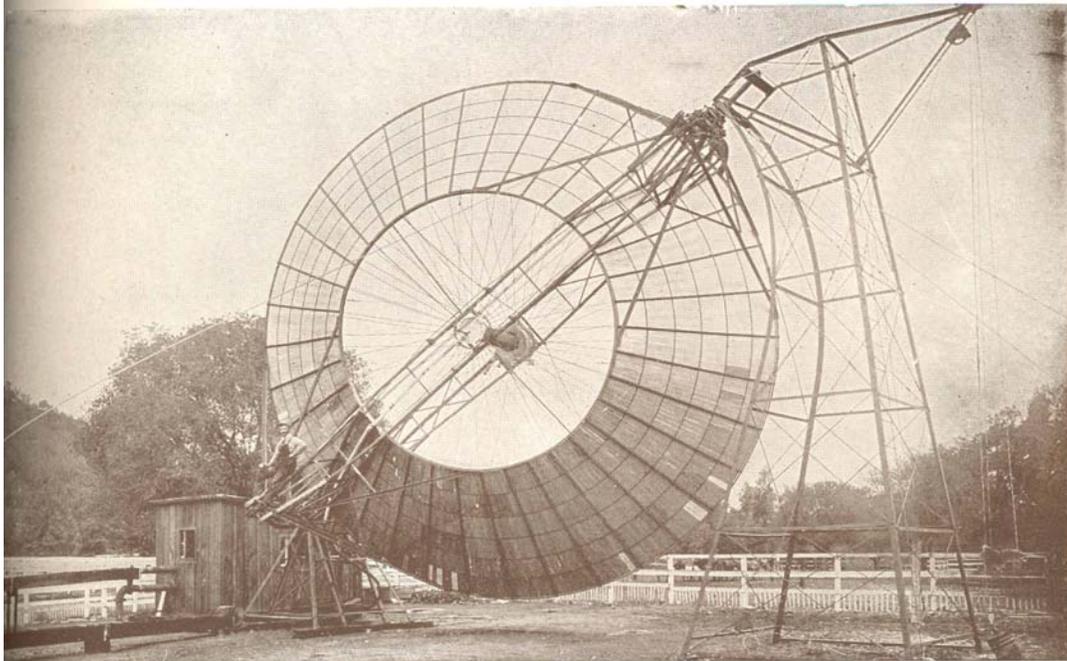


Solar Motor, a mechanism for securing motive power from the sun. For many years the attention of inventors has been directed to the question of utilizing the direct rays of the sun as a substitute for coal, wood, or other fuel; large burning-glasses or reflectors being the general form of the various machines. A so-called "burning mirror," made in France by Villette, was four feet in diameter, and produced so intense a heat that, according to the report, it melted cast iron in 16 seconds. In England, a Mr. Parker years ago built a lens about three feet in diameter, which melted a cube of cast iron in three seconds, and granite was fused in one minute. This result was produced from a concentrating surface of seven square feet; which suggests that if the reflector could be made so that the field of concentration would be a square mile the iron would melt in less than a millionth of a second, suggesting the possibilities in this direction with enormous reflectors, or groups of small ones. It was for a long time difficult to build a concave mirror of very large size, but this was finally overcome by having the surface of the concave mirror covered with small pieces of glass, or mirrors, each of which is so placed that the light or reflection from each side is thrown upon the same spot, the sum total, or the amount of heat centralized, being equivalent to the amount reflected by each glass, multiplied by the number of mirrors. In Europe the early solar glasses were generally of two kinds; that is, the heat was concentrated in two ways - by reflection from polished concave mirrors and by refraction through a convex lens. The earliest use, centuries ago, of such a contrivance was theoretically to dazzle or blind an enemy, metal disks being employed; but nearly all such devices failed to be of any practical value. Sir William Herschel experimented with the sun's heat in Africa; and Captain Ericsson made a number of studies in this direction and exhibited a solar motor in New York in 1884.

Within recent years a successful sun motor has been built at South Pasadena, Cal., and here an automatic engine is run by the heat of the sun. In

appearance the motor resembles a huge disk of glass, and at a distance might be taken for a windmill; but the disk is a reflector 33 feet 6 inches in diameter on top, and 15 feet on the bottom. The inner surface is made up of 1,788 small mirrors, arranged so that they concentrate the sun upon the central or focal point. Here is suspended the boiler, which is 13 feet 6 inches in length, and holds 100 gallons of water, leaving eight cubic feet for steam. The motor is attractive in appearance; built lightly, supported by seeming delicate shafts, though in reality strong enough to resist a wind pressure of 100 miles an hour. The reflector must face the sun exactly, and as heavy as it is, weighing tons, it can be easily moved. It stands, after the fashion of the telescope, upon an equatorial mounting, the axis being north and south; the reflector follows the sun, regulated by a clock, the work being automatic, as, in fact, is everything about it. The true focus is shown by an indicator, and in about an hour after it is adjusted the boiler is seen to have attained a white heat and the steam gauge registers 150 pounds. The steam is carried from the suspended boiler to the engine in a flexible phosphor-bronze tube and returns again from the condenser to the boiler in the form of water, so that the boiler is kept automatically full. The engine is oiled automatically, and when the disk is once turned, facing the sun, it runs all day as independent of an engineer as does a windmill. The amount of heat concentrated in the boiler by the 1,788 mirrors cannot be realized, as nothing can be seen but a small cloud of escaping steam; but should a man climb upon the disk and cross it he would literally be burned to a crisp in a few seconds. Copper is melted in a short time, and a pole of wood thrust into the magic circle flames up like a match. That the motor is a success is seen by the work it is doing - pumping water from a well, illustrating the possibilities of cheap irrigation and lifting 1,400 gallons a minute. The motor has produced results equal to 10 horsepower. In the cloudless regions of the West the solar motor promises to give a great impetus to the development of arid lands.



Sun (or Solar Motor)
Back and Side views of the reflector.