

ENGINEERING

147-Mile Transmission Line Protects Chicago's Power

Defense Construction Will Be Less Likely To Suffer From Current Failure Because of New Installation

DEFENSE construction in and around Chicago will, on account of a new high voltage power line just completed, be less likely to suffer from electric failure. Details of the line, which is 147 miles long, and brings more than 200,000 horsepower of electrical energy from coal fields in southern Illinois, were given by M. S. Oldacre and F. O. Wollaston, of the Commonwealth Edison Co. They spoke before the meeting of the American Institute of Electrical Engineers in Philadelphia.

Special consideration, they reported, was given in designing and building this line to obtain reliable service and eliminate outages caused by the two worst enemies of transmission lines—sleet and lightning—both of which are quite prevalent and severe along the route of the line. As a result of study by engineers connected with the operation of existing transmission lines and also those of the electrical manufacturing companies, it is believed that the solution of these two major troubles of transmission lines has been obtained.

It has been found that when wind of sufficient force strikes sleet-covered wires, the wires will be lifted momentarily in the same way as a kite or airplane, and the alternate rising and falling and the swinging of the wires causes them to appear to "gallop" and sometimes come in contact with one another. This will

at least interrupt power service over the line if it does not cause actual burning or breaking apart of the wires. Common practice on important smaller lines is to put extra electric current through the sleet-covered wires to melt the sleet away before it becomes dangerous. The wire or cable required for this line was so large—one and one-sixth inches in diameter—that it could not be heated sufficiently. Instead, extra-strong supports were provided and the wires placed farther apart than usual so that there is no chance of the wires "galloping" or swinging together.

The elimination of lightning troubles on existing transmission lines has been obtained by using sufficient insulators for the electric wires and by placing additional wires above the electric power wires to intercept the lightning currents and direct them into the earth over paths of very low resistance. On this new line the latest type of high-strength insulators, nearly ten feet long, have been used and the intercepting wires, known as "ground" wires, have been installed so that there is practically no chance of a lightning flash to the electric wires.

Science News Letter, February 8, 1941

Combination Drive

COMBINING electrical and mechanical drives, a new principle for transmitting power from a bus or truck engine to the wheels was described by Ernst Weber, of the Polytechnic Institute of Brooklyn, speaking before the meeting of the American Institute of Electrical Engineers.

In ordinary electric drives, he explained, there is no mechanical connection between the engine and the drive. The former runs an electrical generator, the current from which operates a motor in the transmission.

The "Electrogear," as the new device is called, uses two electrical machines as in the electric drive, but these machines are constantly coupled through a differential gear. Now, in the electric drive one machine always acts as generator and ab-

sorbs all the engine power and the other machine always acts as motor carrying the entire power to drive the vehicle; this accounts for the considerably lower overall efficiency as compared with the standard mechanical drive.

In the "Electrogear," however, the two electrical machines carry only a fraction of the engine power and alternate as generator and motor depending on the car speed and on the road condition. This interchange is controlled by a small auxiliary generator, comparable to the battery charging generator. Since there is continuous mechanical connection between the engine and the driven axle, the electric power only acts as a torque regulator or continuously variable gear ratio; it goes into over drive automatically. This, Mr. Weber said, accounts for the high overall efficiency and for a fuel economy at least comparable with that of the standard gearshift transmission.

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Air Resists Current

CIRCUIT breakers are important electrical accessories, for, when a short circuit occurs, they disconnect the lines, preventing damage. In the past, it has been the practice where heavy currents are involved, to immerse the breaker in an oil bath, since the current would arc across the space between the contacts in air.

Two Westinghouse engineers, however, told their colleagues of a new type they have devised. Though only air separates the contacts, it can break a circuit of 50,000 amperes at 5,000 volts, they declared. This is accomplished, they explained, by the use of magnets which fill the space with ionized gases having a much greater resistance than normally.

Science News Letter, February 8, 1941

Light 3-Horsepower Motor

A THREE-HORSEPOWER electric motor, which weighs less than 12 pounds compared with 150 pounds for an ordinary motor of the same power, has been developed for aircraft use, T. B. Holliday, of the U. S. Army Air Corps at Dayton Field, told the meeting. During the last two years, he said, the output of engine-driven electric generators has been increased eight times, with but a small increase in weight.

Science News Letter, February 8, 1941

Nearly half of the 92 known elements are used in an *automobile*.

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