

The Knowledge Bank at The Ohio State University

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Creators: Ewart, Roger L.

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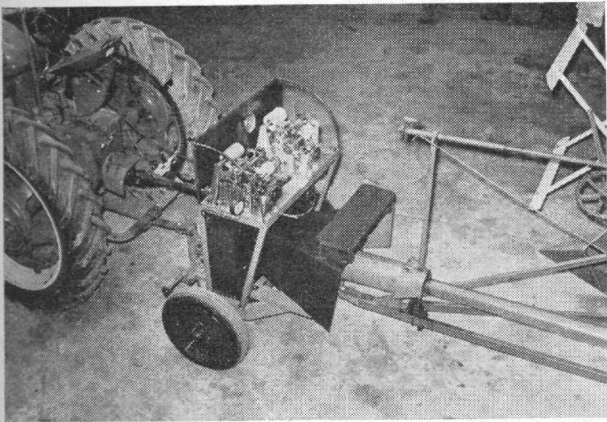
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Transmission Dynamometers Developed By Ohio State University Ag. Engineering Student

Roger L. Ewart, Ag.E IV

The power take-off method of applying power to the mounted or drawn farm machine has come into general use since 1925. Until the present time there has been no means of measuring the power required to operate a "power take-off" driven machine under the actual field operating conditions.

However, Robert J. McCall, Grad., designed and built, for his master's thesis, a transmission dynamometer here at Ohio State in 1940. It measures both the power required to drive the pulled machine through the power take-off shaft and the drawbar pull, recording each result separately and simultaneously.



Dynamometer Built by McCall and Used by Ohio State College of Agriculture

McCall started his work two years ago, obtaining his funds and material through the joint sponsorship of the Department of Agricultural Engineering here and the Ohio Agricultural Experiment Station at Wooster.

The dynamometer resembles a two-wheeled automobile trailer. The mounting consists of a steel box, 4' long, 3' tall, and 8" wide mounted crosswise on two rubber-tired wheels. On the front side of the box the power take-off shaft from the tractor is connected by a splined coupling and on the rear the power take-off shaft of the implement. Beneath the box is the hydraulic cylinder of the drawbar coupling between the tractor and drawn implement, while on top of the box are two integrating and recording in-

struments that are connected, one to the internal mechanism of the machine and the other to the hydraulic drawbar unit.

The machine, itself, weighs 1100 pounds subject to increase due to weight of the operator. The most expensive parts of the machine are the two integrating and recording instruments each costing \$1700, while the materials for the remainder of the machine cost but \$300.

During the past summer this dynamometer was coupled between a Farmall-M tractor and a Massey-Harris six-foot combine and successfully tested here on the University farm. For the first time in history, it was possible to measure and record, separately and at the same time, the power applied to drive the mechanism of a pulled machine and that required to pull it under actual field conditions. It was found that under ideal combining conditions the torque requirement of the combine mechanism was 18 horsepower and that required to pull it barely three horsepower. Both are unexpected figures.

Equipment of this type is valuable in teaching some phases of the advanced machinery courses, particularly in agricultural engineering. Lastly, and most important, it serves a need in the research field as a means for determining the power required to operate a machine as affected by various adjustments and conditions.

WHAT DO YOU KNOW ABOUT ELECTRICITY?

Due to an unavoidable error in make-up, the WESTINGHOUSE ELECTRIC and MANUFACTURING CO. advertisement on page three in the November Issue of the Engineer was incomplete. Refer to your last issue and check your knowledge of electricity with the correct answers listed below:

Lightning Experiment . . . A Faraday cage
Mass Spectrograph Sorts atoms
according to mass

Biggest Generators . . . Grand Coulee
Mechanical Man Elektro

Fast X-Ray . . . 1,000,000th of a second
Precipitron . . . Electrostatic attraction