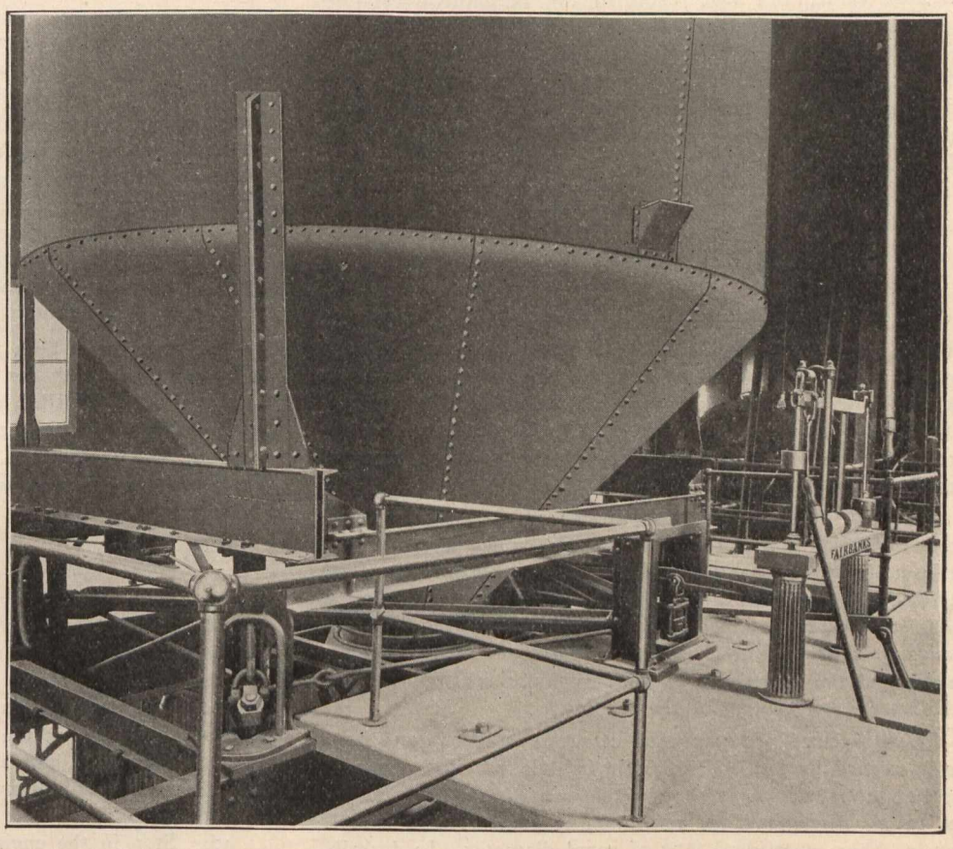
by using the work by "impulse" instead of work by "reaction," we have sought to obtain an engine using as little steam as possible, simple in construction, needing but little care in working, and capable of running for a long time with but little wear and tear, which, although inevitable, can yet be reduced to a very small amount. The loss of steam is entirely confined to the clearance allowed around the shaft. Moreover, the live rings are so constructed as to be very light, and this is of advantage in reducing the gyroscopic effect which comes into play when the vessel pitches.

It has been said that with this system, supposing one could reduce the loss of steam to a minimum, it would, on the other hand, greatly decrease the efficiency by the friction between the rings and the steam contained in the chambers in which the rings rotate. As a matter of fact, however, the friction in our engines of 1,000 to 2,000 horse-power amounts to only 2 or 3 per cent. of the maximum power—an insignificant proportion—whereas in turbines without diaphragms the loss by the escape of steam reaches 10, 15, and even 20 per cent. of the maximum horse-power directly the clearances increase at all. All the trial results so far obtained show that our system of turbines is extremely economical in steam consumption. The author concludes with examples of the work of some of his turbines.

FAIRBANKS HOPPER SCALE.

The accompanying illustration is one of four 1,800-bushel Hopper Scales installed in the Government elevator, "Commissionaires du Havres," No. 1, Montreal. This elevator has a capacity of one and one-half million bushels, and was erected by the Steel Storage and Elevator Construction Co. The entire elevator was built of steel and cement, and the scale frame-work of structural steel, as shown in illustration. These scales are of a type which have recently come into use in these new elevators and possess some advantages over the old type.

As shown in this illustration, the levers are hung from yokes which rest upon the steel frame-work of the floor on which the scales are set, thus bringing the working parts of the scale up above the floor-level and in plain view, so that any displacing of scale parts can be readily observed, and they can be kept free from dust and dirt. The scales are equipped with Fairbanks Patented Type Registering Beams, which print a ticket giving the weight of the load.



Fairbanks Hopper Scale.

The test of these scales was remarkably successful; out of a total capacity of one hundred and eight thousand pounds, the maximum variation that could be detected was 7 lbs., on one scale only 2 lbs. The scales are easily sensitive to 2 lbs. or one-fifty thousandth part of the load.

THE STANDARDIZATION OF ELECTRICAL MACHINERY.

London Engineering contains the interim report of the sub-committee of the Engineering Standards Committee on generators, motors and transformers, dealing with the principal conditions with which it is desirable that these articles should conform. The committee determined not to risk hampering the trade with standard dimensions and shapes which might easily become obsolete as designs improved, but confined themselves to the more immediate necessity of securing uniformity in pressures and frequencies, rating of plant and conditions of test. The standard voltages recommended are as follows:

Alternating or direct-current at the terminals of the consumer	110, 220, 440 and 500 volts.
Alternating current at the generating terminal	2200, 3300, 6600 and 11,000 volts.
Standard pressure at primary terminals of alternating-current transformers	2000, 3000, 6000 and 11,000 volts.
Standard pressure at secondary terminals of alternating-current transformers	115, 230, 460 and 535 volts at no load
Standard pressure at terminals of direct-current traction motors	500 volts.

A variation of 10 per cent. either way is permitted in the above figures, so that plants built to the standards recommended may be employed on the great majority of the existing systems, although it is hoped that in course of time such latitude will become unnecessary. For alternating current a frequency of 50 periods per second is to be adopted as the standard, although in special cases, where a lower frequency is advisable, a secondary standard of 25 cycles is allowed. The difficulties in connection with the rating of generators and motors have been met by dividing the machines into two classes, according as they work continuously or intermittently. Machines of the former class must be capable of giving the rated output continuously for six hours, and the latter for one hour. When not otherwise specified, continuous working is always to be understood, and every machine is to bear name-plate giving such particulars of the output, voltage, frequency, revolutions per minute, exciting current and power factor, as bear upon its particular type. The output of generators is to be measured in kilowatts, and that of motors in brake horse-power. Direct-current generators are in future to be made in six standard sizes—from 6 to 100 kilowatts, inclusive—and a suitable speed has been recommended for each size. From 100 to 1,000 kilowatts, inclusive—there are nine sizes—machines up to 250 kilowatts having two alternative standard speeds, while above this size an