CALCULATION OF STEAM CONSUMED PER HOUR, AND PER HOUR PER HORSE POWER.

The total weight of water registered by the meter in four and one-half hours was $1529.1 \times 64.70 = 98933$ lbs., or 21985 lbs. per hour. From this there is to be deducted the leakage of the blow-off valves of the boilers, which amounted to 165 lbs. per hour, the steam which passed through the Barrus calorimeter and the steam which flowed from a dead end in one of the steam pipes in order to prevent water collecting in the same. The amount of steam returned from the dead end is calculated from the rise in temperature of the feed water, assuming that the steam is dry. This will give too low a correction on account of the amount of moisture that may be present in the steam, but as the whole correction is a small one the error involved is not of importance.

The error involved by neglecting any moisture contained in the steam thus returned to the feed water will be against the economy of the engine.

The increase of temperature of the feed water due to the returned steam was $142.7 - 131.3 = 11.4$ degrees Fahr. The heat units imparted to the feed water per hour will be $11.4 (21985 - x)$ in which x is the amount of steam condensed. Each pound of steam parts with $1221 - 142.7 = 1078.3$ B. T. U., so that we have $1078.3 x = 11.4 (21985 - x)$, from which obtain

$x = 230$ lbs. per hour.

The amount of steam passing through the Barrus calorimeter was 102 lbs. per hour. The calorimeter was in operation four hours and five minues, so that the total steam passing through it was 416.5 lbs., or the average rate was $416.5 \div 4\frac{1}{2} = 93$ lbs. per hour.

The total amount to be deducted from the water passing through the meter is, therefore, $165 + 230 + 93 = 488$ lbs., and the net steam consumed by the engine per hour is $21985 - 488 = 21497$ lbs.

The steam per hour per horse power is $21497 \div 1592.2 = 13.50$ lbs.

CALIBRATION OF INDICATOR SPRINGS.

The standard of pressure for the springs used on the high pressure cylinder was the Utica Steam Gauge Company's