But this twisting moment is balanced by the pull on the spring balance, P, multiplied by its leverage, r.

$$\therefore 2 p f r_1 = P r.$$

The angle turned by the pulley or drum, D, per minute $= 2 \pi n$ radians, and since the work done by a couple is the product of its moment into the angle through which the body acted on turns :—

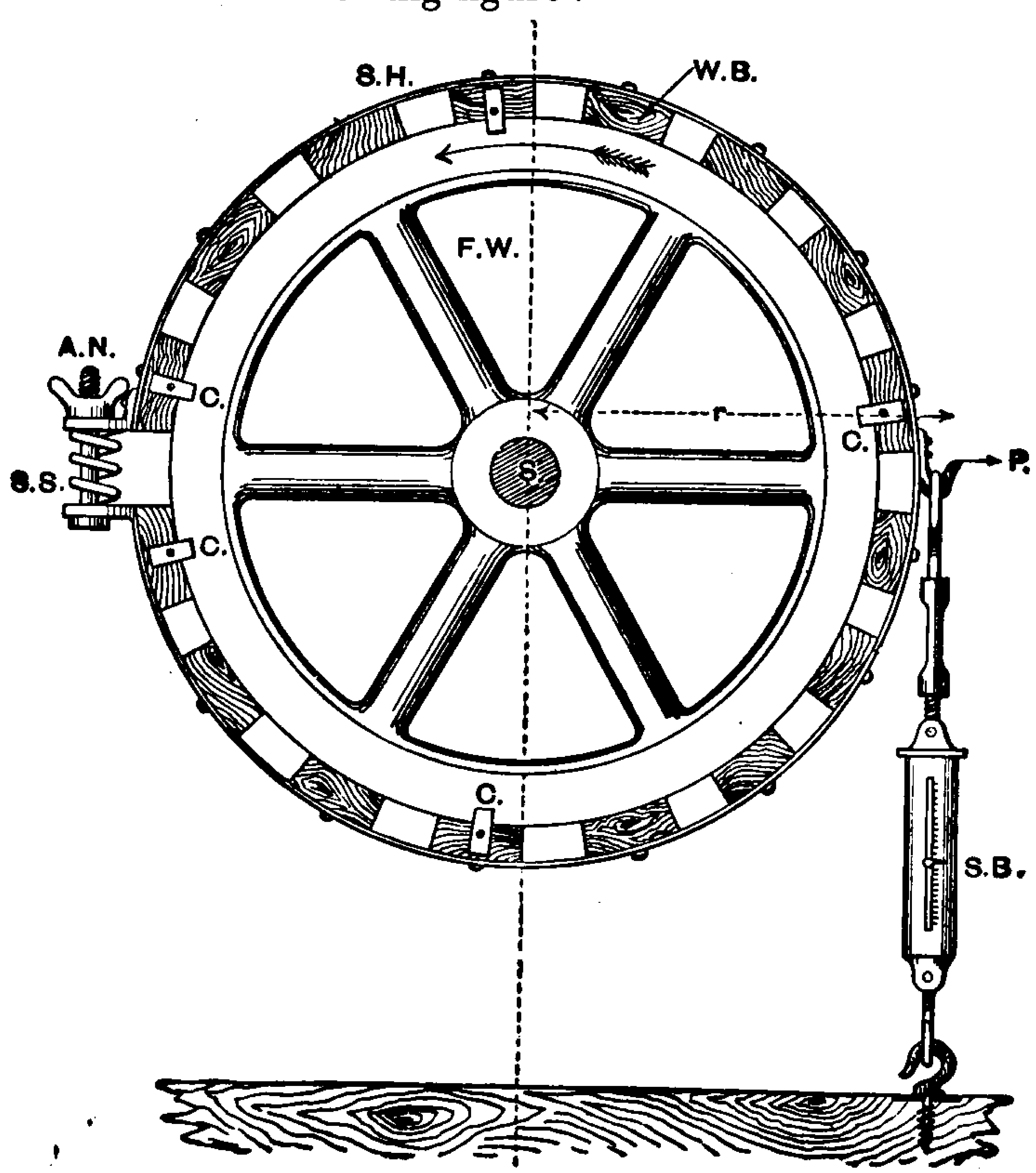
The work absorbed by friction = The work done per minute in foot-pounds, *i.e.*,

$$2 p f r_1 \times 2 \pi n = P r \times 2 \pi n$$

$$\text{and} \therefore \text{the H.P.} = \frac{P r \times 2 \pi n}{33000} = \frac{2 \pi r n P}{33000}.$$

It is sometimes advisable to add a dash pot to the lever, I B, in order to get steady readings of the Salter's balance or weight, P.

Another very useful and practical form of Prony Brake is that shown in the following figure :—



Here the balance weight and ram nuts are done away with, in favour of a steel hoop or strap, S H, to which are fitted wooden blocks, W B, with spaces, of say 2 inches or so intervening between them, surrounding the fly-wheel, F W, keyed on the crank shaft, S. Clips, C, made of iron or steel, keep this brake strap fair on the fly-wheel, and thus prevent it from sliding to one side more than another.

The engine is started with the adjusting nut, A N, and the spiral spring, S S, slack until it reaches the normal speed. The nut, A N, is now gradually tightened, the speed being kept constant and the pointer, P, level; the tension on the Salter's balance, S B, is read off and the calculation made for the B.H.P. exactly as in the former example. This form of brake is now adopted by several well-known makers; and, as the author has frequently used it in testing these engines, he can confidently recommend it in preference to the former method. Messrs. Alley & Maclellan, the makers of the Westinghouse fast-speed engine, keep the adjusting nut, A N, and spiral spring, S S, at the right-hand side, and do away with the Salter's balance, S B, substituting instead an ordinary Pooley weighing balance (of the same pattern as is to be found at every railway station), placed on the left-hand side. Then the pressure on the base of the Pooley balance directly measures P, in lbs.

One of the best known forms of friction-brake dynamometers, fitted with a compensating device, is that designed by Mr. C. E. Amos and Mr. Appold, and is the form used for the larger powers by the Royal Agricultural Society. It is similar to that shown by the next figure; but, besides a hand-adjusting screw, A S, similar to that shown in the last figure, it is provided with a compensating lever, E C D, by means of which the rise or fall of the load, W, is to be attended with a decrease, or increase, in tension on the brake-strap, so that a position of equilibrium is automatically attained without causing inaccuracy in the indications. With a given tension in the brake-strap, and with the load, W, carried so that its point of suspension, A, is opposite the pointer, ⟶, the lever, E C D, takes a vertical position; but as soon as the load, W, is lifted, the lever pivoted at E, moves round to the left-hand, and increases the length of the brake-strap, thus slackening it, and allowing the load again to descend. If, on the other hand, the total friction decreases and is insufficient to carry the load in its normal position, the descent of the load presses round the point of the compensating lever to the right, thus tightening the belt and increasing the frictional grip until the conditions are again such as will enable