employing photography in the determination of the velocity

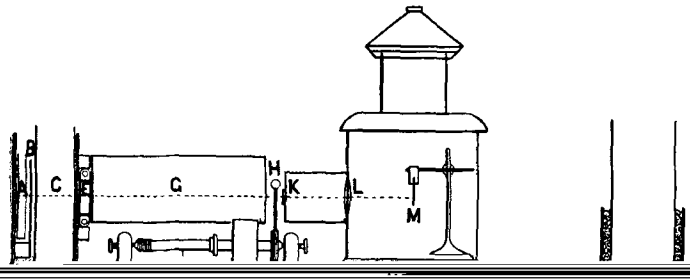
A photographic plate was placed at the back of the rect-

the movement of a single tooth corresponds to one revolution

revolving disk H, driven by the Froment's engine F, and

Thornton-Pickard shutter E, the glass vessel C, and a rectangular aperture in the screen B on to the plate at A.

Fig. 1.



for any desired fall. In practice failures sometimes occurred.

We may conveniently consider the motion of a sphere falling in a viscous fluid to be divided into two stages. In

$$\therefore \frac{f}{g} = \frac{W-R}{W},$$

$$\therefore R = \left(1-\frac{f}{g}\right)W,$$

motion through the liquid. This will include at least two

A similar tube for increasing the height of fall was pro-

In Plate I. fig. 1, one of these two tubes may be seen supported by a retort-stand, on the extreme left of the picture.

The dimensions of the glass vessel first used were as follows:—length 11·5 centim., width (from front to back) 3 centim., depth 28 centim., all internal measurements. The internal diameter of the tube used to produce a higher fall was 2·4 centim.

An increase in the height of fall from 34 centim. to 46 centim. produced an increase in the velocity of the largest

with a fall of 45 centim. (the vertical distance from the electromagnet to the top of the rectangular aperture) all the balls would have practically attained their terminal velocity. The

also made 4·5 centim. in diameter. The vessel was connected by a siphon with a large vessel of water, so as to keep the water-level nearly unaltered when this tube was filled by suction.

TABLE VIII.

Steel Balls in Water.—Large Vessel.

1·0 1·1 1·2 1·3 1·4 1·5 1·6 1·7

constant k in the relation

$$R = k\rho a^2 V^2 ;$$

for if W is the actual weight of a sphere,

$$R = \frac{\sigma - \rho}{\sigma} W,$$

and so

$$\log k = \log W + \log\left(\frac{\sigma - 1}{\sigma}\right) - 2 \log aV.$$

The mean density of the steel balls was found to be 7·731.

II. $5{\cdot}61 \times 10^{-4}$.
III. $5{\cdot}42 \times 10^{-4}$.
IV. $5{\cdot}49 \times 10^{-4}$.
V. $5{\cdot}52 \times 10^{-4}$.

12. *Fall of an Oiled Sphere.*

The photograph reproduced in Plate II. fig. 4 is of special interest since it shows the fall through water of a sphere oiled

agrees with that deduced theoretically by Stokes for non-