$\delta\omega$ is the change in the velocity of the wheel in time δt., and further an acceleration in the direction of motion or tangential to the circle in which it is travelling, we may call this the tangential acceleration. These accelerations of the weights, which only come into play when the speed changes, may be made to oppose or assist the effect due to centrifugal force, and thus may be made to cause slow or rapid change of adjustment.

The diagrams in Fig. 43 will show the meaning of this very nicely where in all cases *A* is the centre of rotation, *B* the point of connection of the weight to the disk and *G* is the centre of gravity of the weight. The centrifugal force due to radial acceleration of the ball is always in the direction *AG*. At (*a*) the tangential acceleration produces no effect since the tangent to the path of *G* passes through the pin *B* and the force necessary to accelerate the

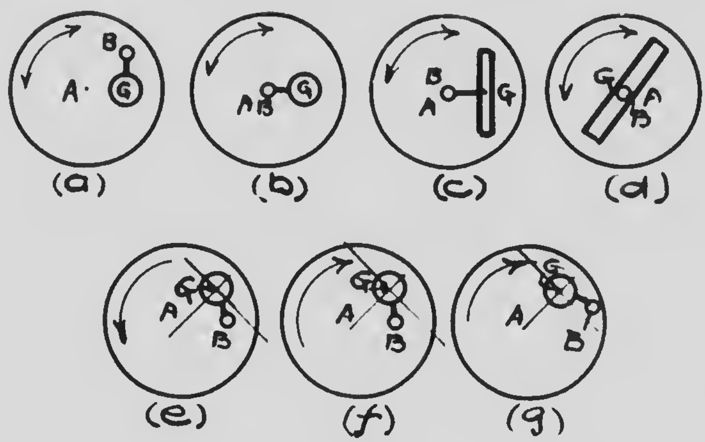

Fig. 43.

weight is borne directly by the pin *B*. At (*b*) the centrifugal effect is zero, the tangential acceleration producing a very decided turning moment about the pin *B*, but in both of these cases the angular acceleration is small since the weight is concentrated about its centre of gravity or its moment of inertia about its centre of gravity is small. (*c*) and (*d*) show a different distribution of the mass, and in both cases the angular acceleration produces considerable effect, and when we have a change of speed $\delta\omega$ we must not only accelerate the centre of gravity *G*, but also the whole weight undergoes an angular acceleration, and in (*d*) the angular acceleration is the only active force.

In the figures (*e*), (*f*) and (*g*) the sense of rotation is marked, and we shall suppose that in each case there is a sudden increase in speed corresponding to a decreased load. In fig. (*e*) the tangential acceleration *assists* the centrifugal force in producing rapid adjustment, while in (*f*) these oppose one another resulting in slower