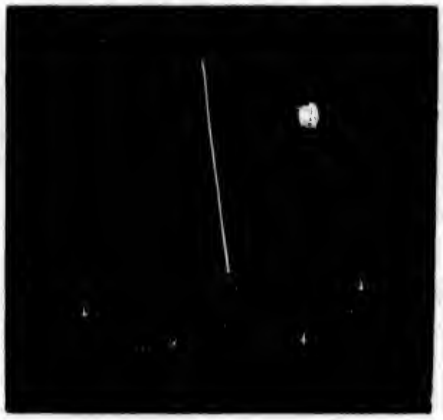
and therefore

$$R.\ OD = P.\ OB + Q.\ OC,$$

which proves the proposition.

Cor. We have taken the case in which the moments of the Forces have the same sign, the proof in this case being sufficient for all.



Where, as in the figure, the two forces tend to turn the system in opposite directions, their moments will bear different signs, and we have, by the same process as above,

$R.OD = P.OB - Q.OC;$

and the direction in which the system tends to turn will be indicated by the sign of the moment $R.\ OD$ found from this expression.

35. *Two Forces act in parallel directions on a rigid system.* Two parallel Forces are equivalent to a single Force

Let P, Q be the two Forces; O, any point in their plane.

Draw $O\ C\ B$ perpendicular to the forces. At B, C, apply two equal and opposite forces T; these will in no way affect the system.

Let R be the Resultant of P, T, acting at B; and S that of Q, T, at C. Then the directions of R, S will in general meet: let them do so in A, and suppose them to act at this point. They can now be here resolved into their original components, parallel to them.